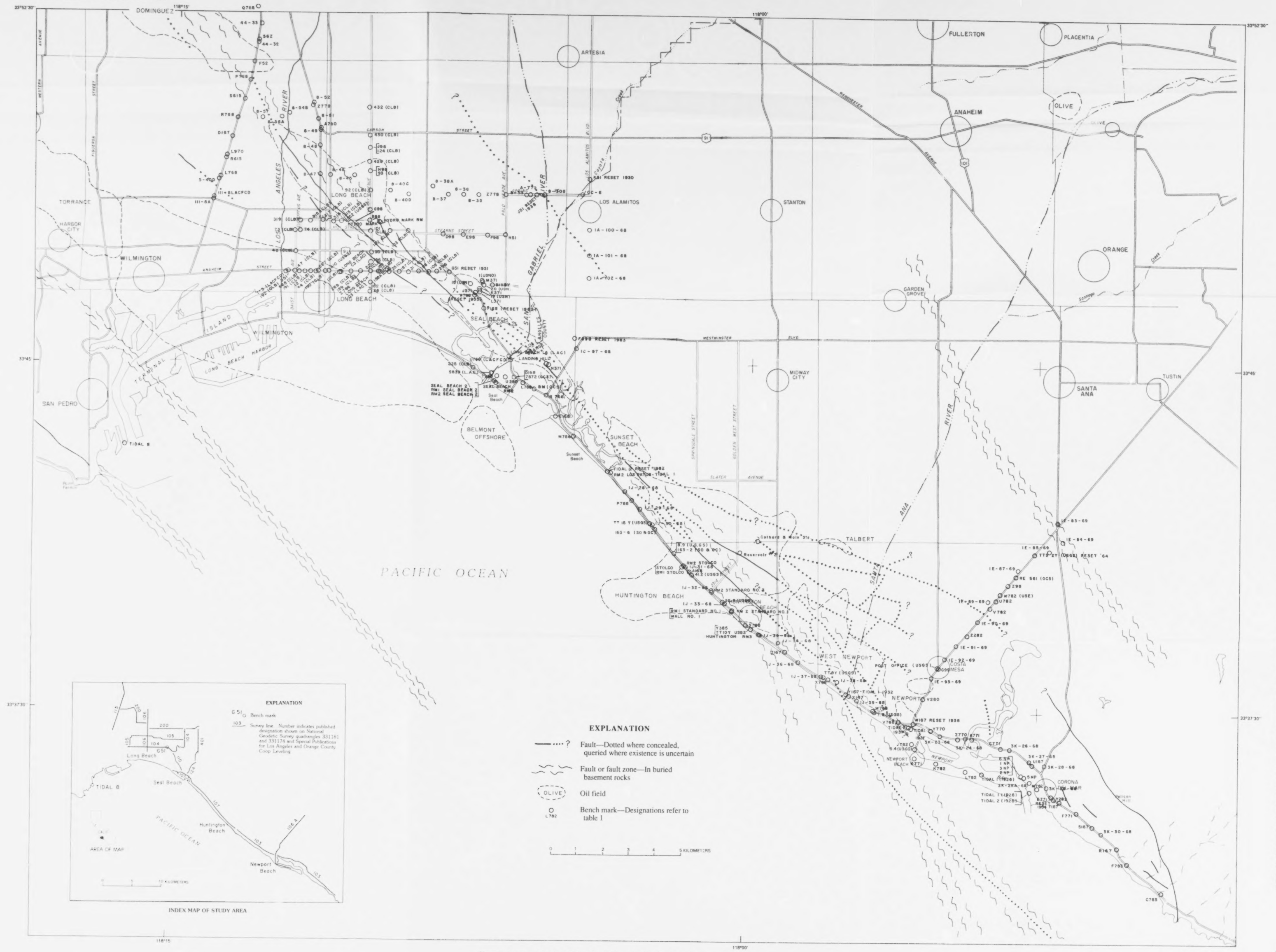
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



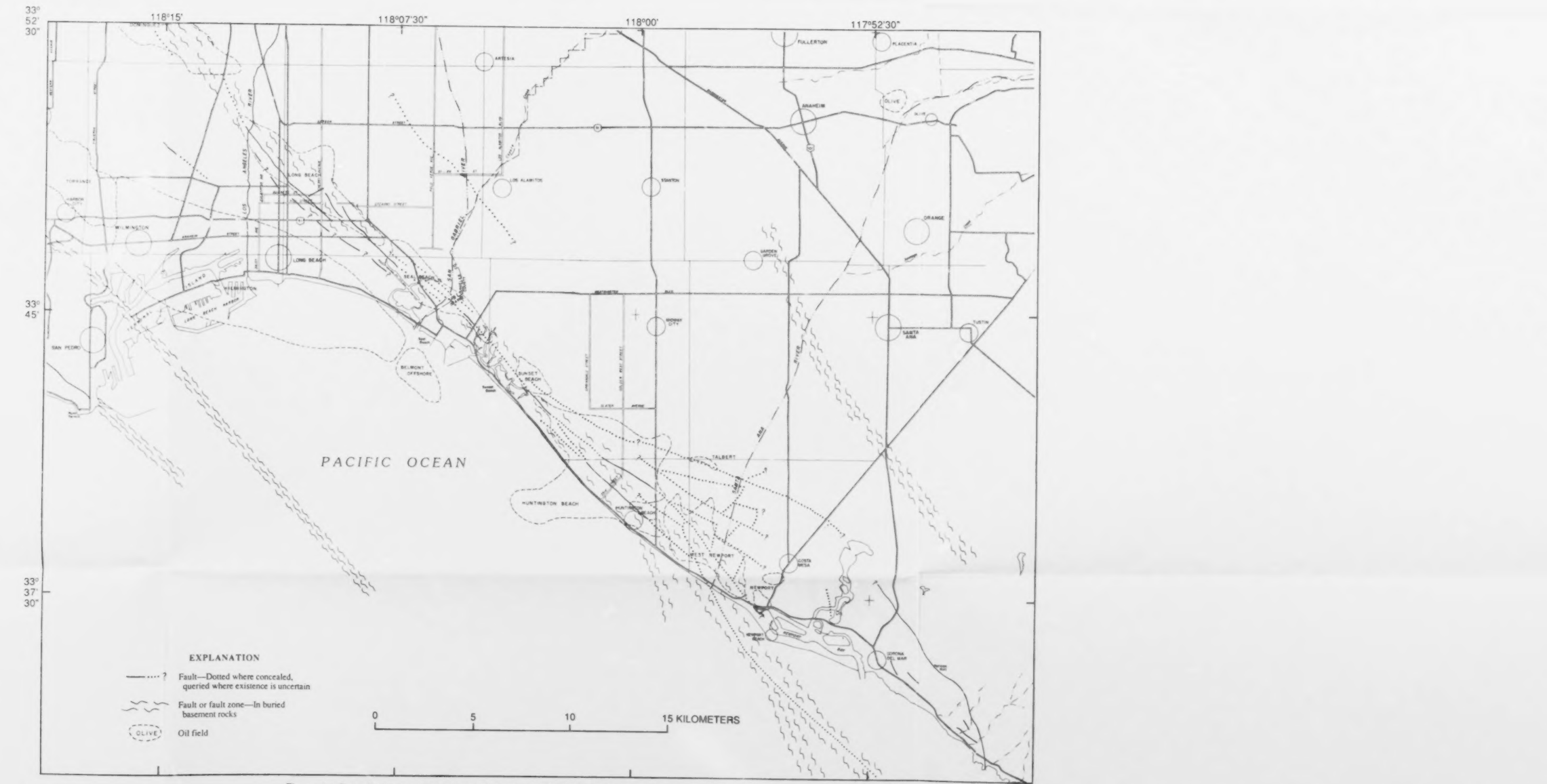
EXPLANATION

Fault—Dotted where concealed, queried where existence is uncertain

Fault or fault zone—In buried basement rocks

Oil field

Figure 1. Generalized map showing faults, fault zones, and oil fields within and along a part of the Newport-Inglewood zone of folds and faults. Faults and fault zones from Yerkes and others (1965, p. A4), Castle (1966, fig. 4), and Poland and others (1956, pl. 3); oil-field boundaries from California Division of Oil and Gas (1961).



VERTICAL SURFACE DISPLACEMENTS ALONG A PART OF THE NEWPORT-INGLEWOOD ZONE OF FOLDS AND FAULTS, LOS ANGELES AND ORANGE COUNTIES, CALIFORNIA

By

Robert O. Castle and Jane M. Buchanan-Banks

1989

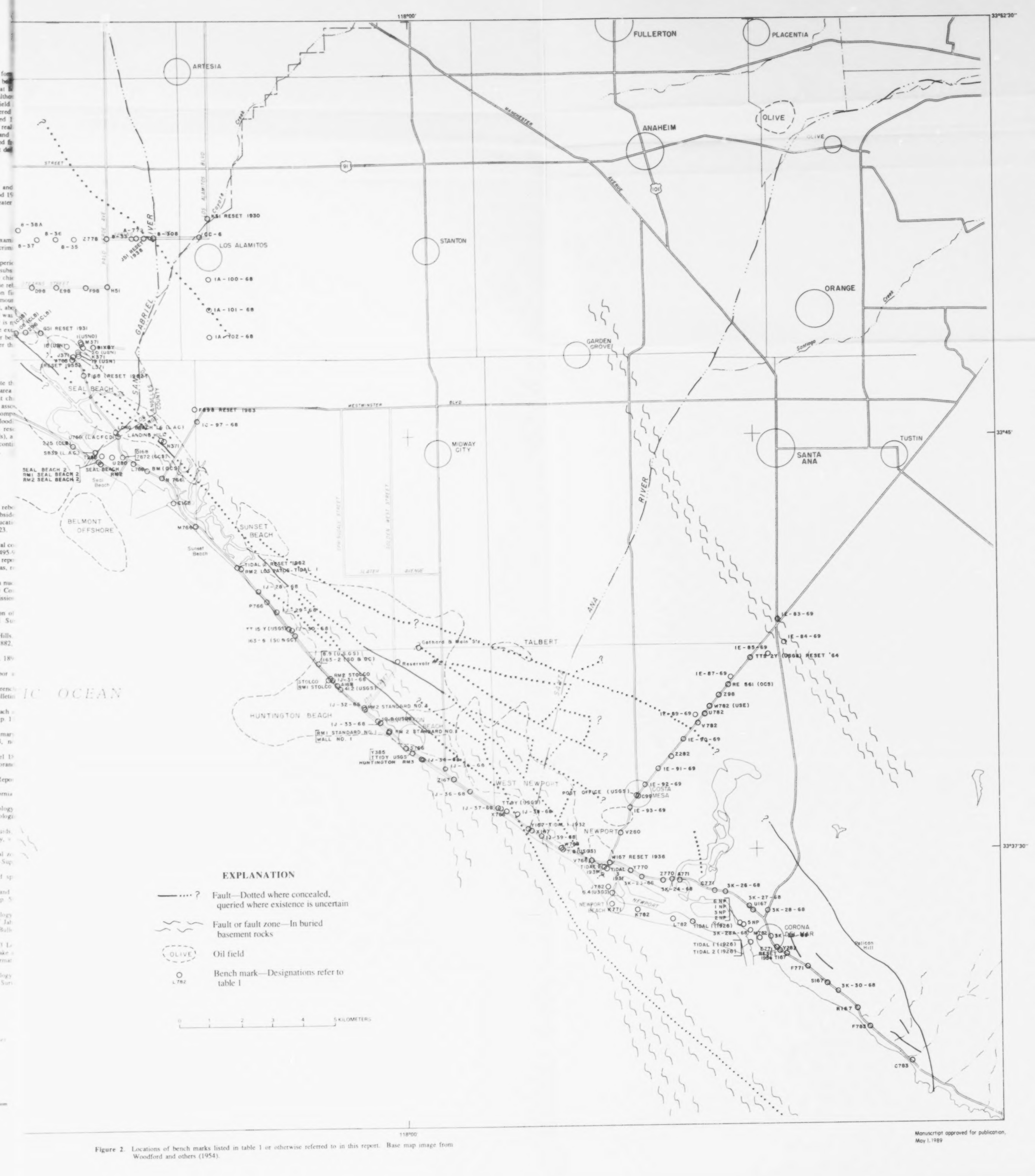
1933-41

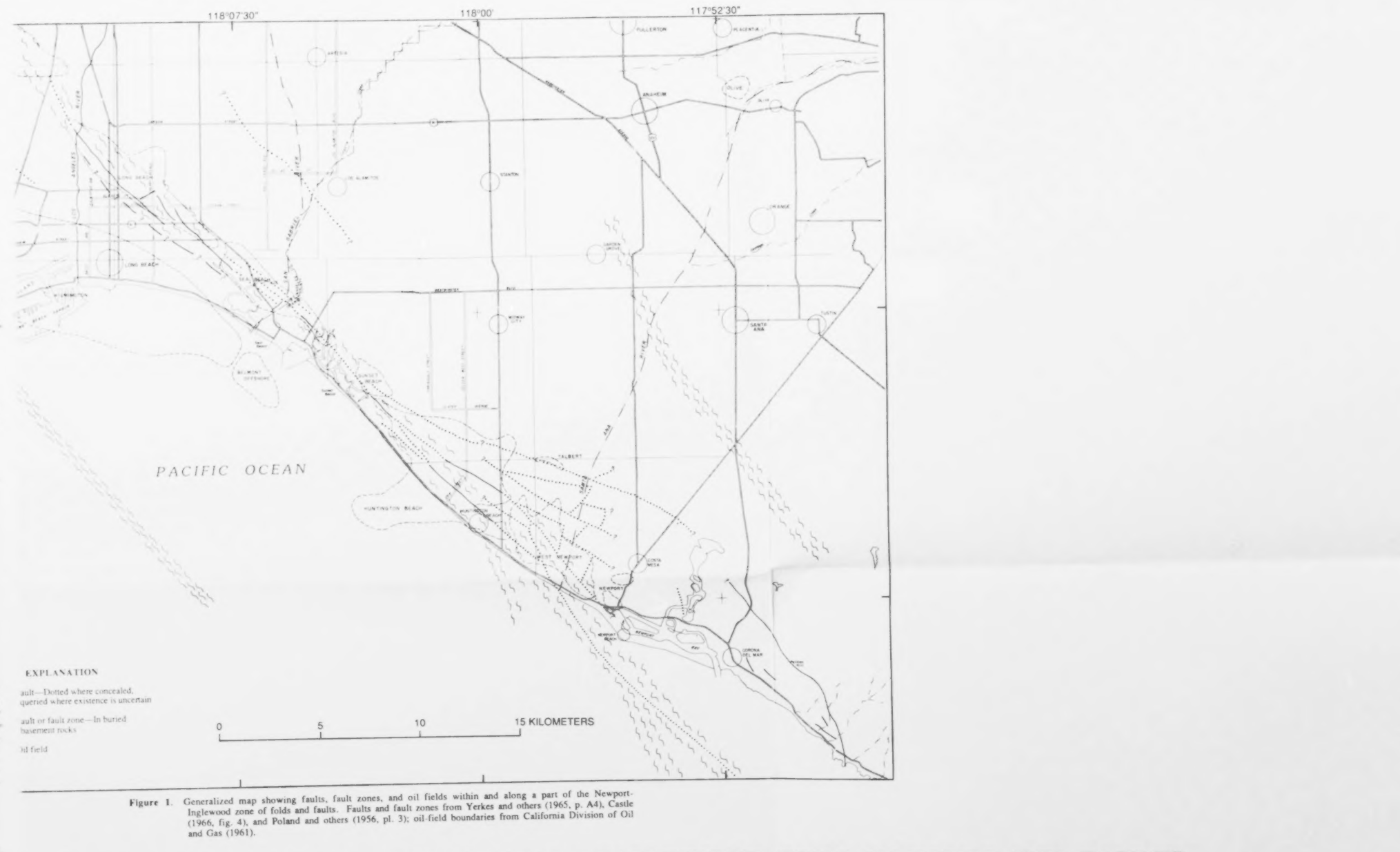
The displacements that dominate the 1933-41 pattern of ... Newport-Inglewood zone (fig. 3, map C) are associated largely ... operations, particularly in and around the Huntington Bea... displacements within the northern part of the study area de... Wilmington subsidence bowl and clearly document relati... subsidence centering on the Long Beach field and, less certainl... as well. Although the likelihood of a tectonic contribution ... displacement pattern cannot be categorically dismissed, nothing ... 41 displacement field that could not be reasonably attributed to ...

1933-68

The height changes that occurred within the 35-yr period ... are largely consistent with what we might have anticipated. ... again dominated by the effects of continuing oil-field oper... evidence as well of modest tectonic activity. Even though we ... as stated at the outset, any attempt at characterizing the mo... Wilmington oil field, the subsidence domain associated w... Wilmington field clearly invades the northern part of the area ... The compaction associated with operations in the Wilming... example, be responsible for the subsidence (measured with respec... Beach oil field--either through edgewater migration or downdrag ... the producing part of the Wilmington field. Partitioning of the ... Beach oil field between that attributable to production from the ... associated with operations in the Wilmington field is, perhaps, ... Thus, if we refer the subsidence over the Long Beach oil field ... through the period 1933-68 the Long Beach field sustained su... compaction of the underlying oil measures of the order of 0. ... subsidence identified with operations in the Wilmington oil field ... Long Beach oil field, *differential* subsidence over the Long Bea... attributable to operations within this field (table 3 and fig. 6)... than about 0.3 m. On the other hand, subsidence over the Hu... whether referred to Tidal 8 or nearby bench marks to the south, ... 0.9 m and probably well in excess of 1.0 m through the period 1...

Because this period encompasses about a third of a c... bracketing surveys were both run to first-order standards, the mod... around Corona del Mar probably is a valid expression of tectonic ... because Tidal 8 is known to be rising with respect to other ... stations (see above), the "absolute" tectonic subsidence of Co... period 1933-68 may have been only a fraction of that shown here.





ENTS ALONG A PART OF THE NEWPORT-INGLEWOOD ZONE OF FOLDS AND FAULTS, LOS ANGELES AND ORANGE COUNTIES, CALIFORNIA

By

Robert O. Castle and Jane M. Buchanan-Banks

1989

... g. 3, map E) is similar in form to that ...). However, and perhaps because the ... is comparison discloses at least one ... -68 map. Specifically, although the ... over the Seal Beach oil field is more ... any other period considered in this ... onstrates that the estimated 1933-68 ... each oil field is certainly realistic--if ... tonic subsidence within and around ... would have been predicted from the ... of the measurements that define the ...

... arison between the 1955 and 1968 ... at occurred within the period 1945-68. ... resentation lies in the greater detail ...

MISCELLANEOUS FIELD STUDIES
MAP MF-2088 SHEET 1 OF 2

Line 115; Quad 331181

Bench mark	Aug. 1926 1/	Aug. 1931-May 1932 2/	1933-1934 3/	July 1945 4/	Mar. 1955 5/	Apr. 1968-June 1969 13/	July 1973-July 1974 14/
111-8 LACFCD	---	5.372	5.362	5.221	5.784	---	---
111-8A	---	---	---	---	---	5.713	5.728
5-40D	---	---	---	---	---	6.784	6.803
L-768	---	---	---	5.796	5.633	---	---
R-615	---	---	---	7.264	7.141	---	---
L-970	---	---	---	---	---	8.243	8.254
D-167	---	---	9.703	9.599	9.491	9.392	9.403
R-768	---	---	---	8.454	8.333	8.205	---
S-615	---	---	---	10.834	10.714	---	---
P-768	---	---	---	13.281	13.167	---	---
F-52	15.504	15.416	15.412	15.282	15.143	---	---
44-32	---	---	---	16.367	16.221	---	---
56Z	---	---	---	17.020	16.862	---	---
44-33	---	---	---	19.494	19.335	---	---
Q768	---	---	---	18.546	18.370	---	---

DEPARTMENT OF THE INTERIOR
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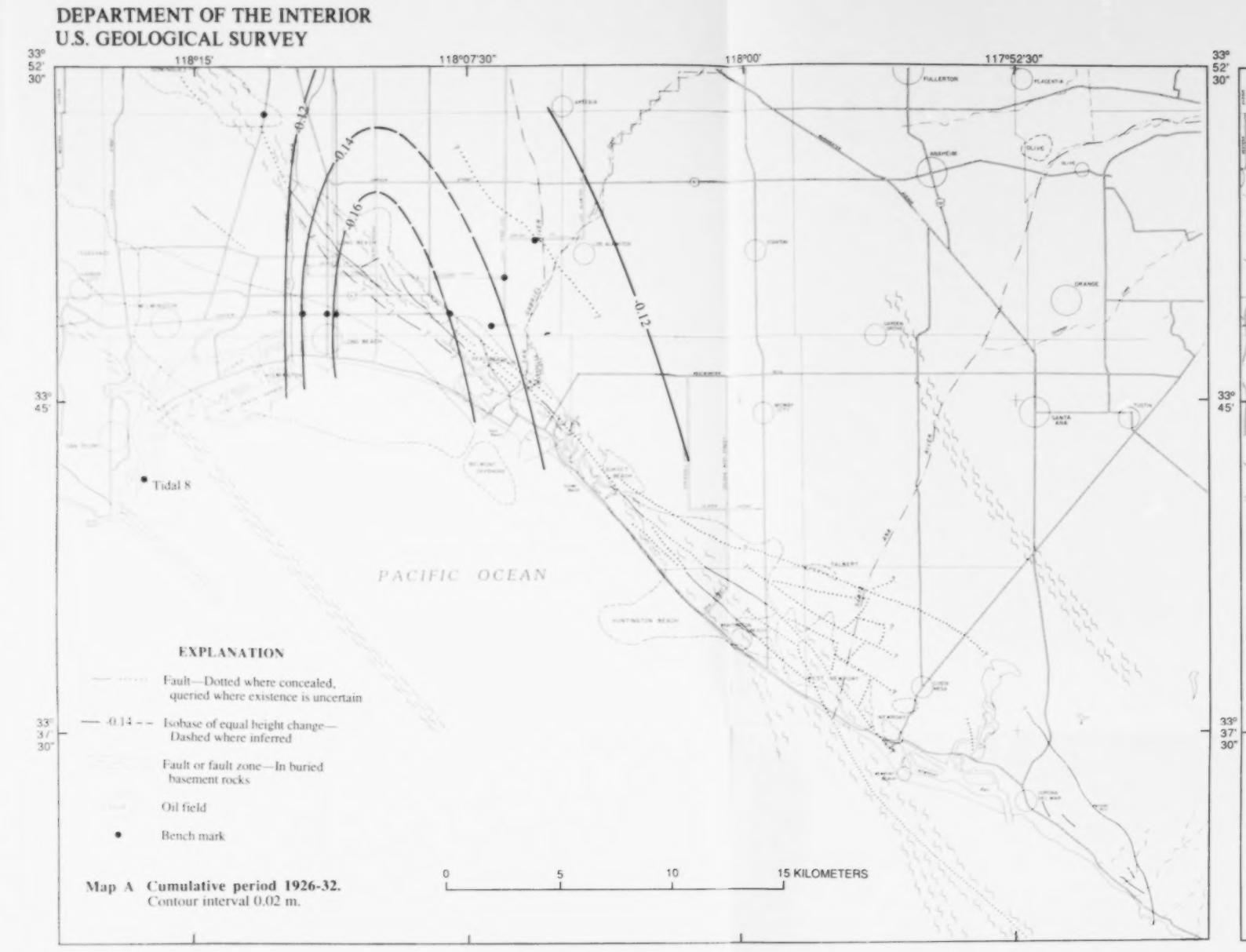


EXPLANATION

Fault—Dotted where concealed, queried where existence is uncertain

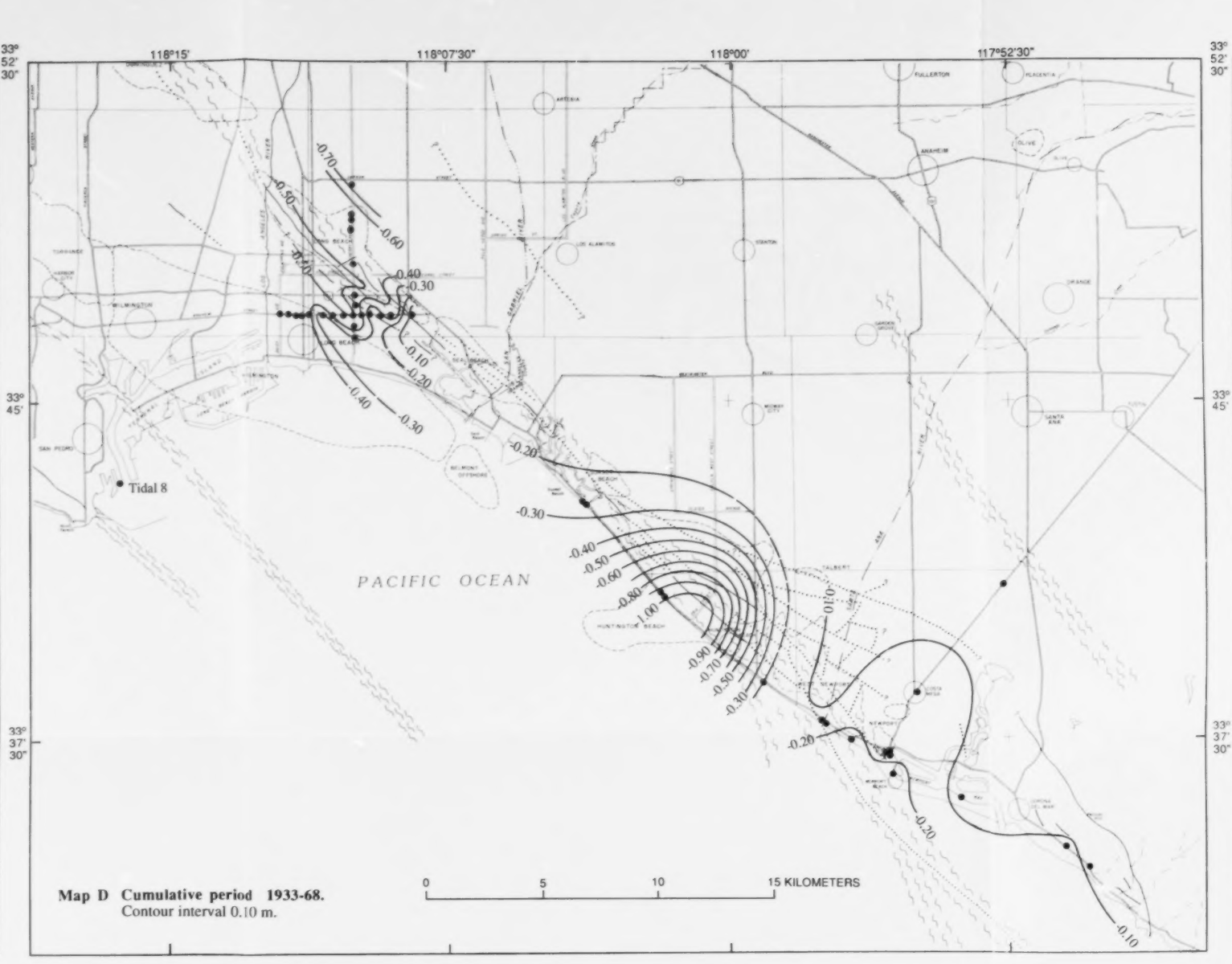
-0.14- Isobase of equal height change—Dashed where inferred

Fault or fault zone—In buried basement rocks

Oil field

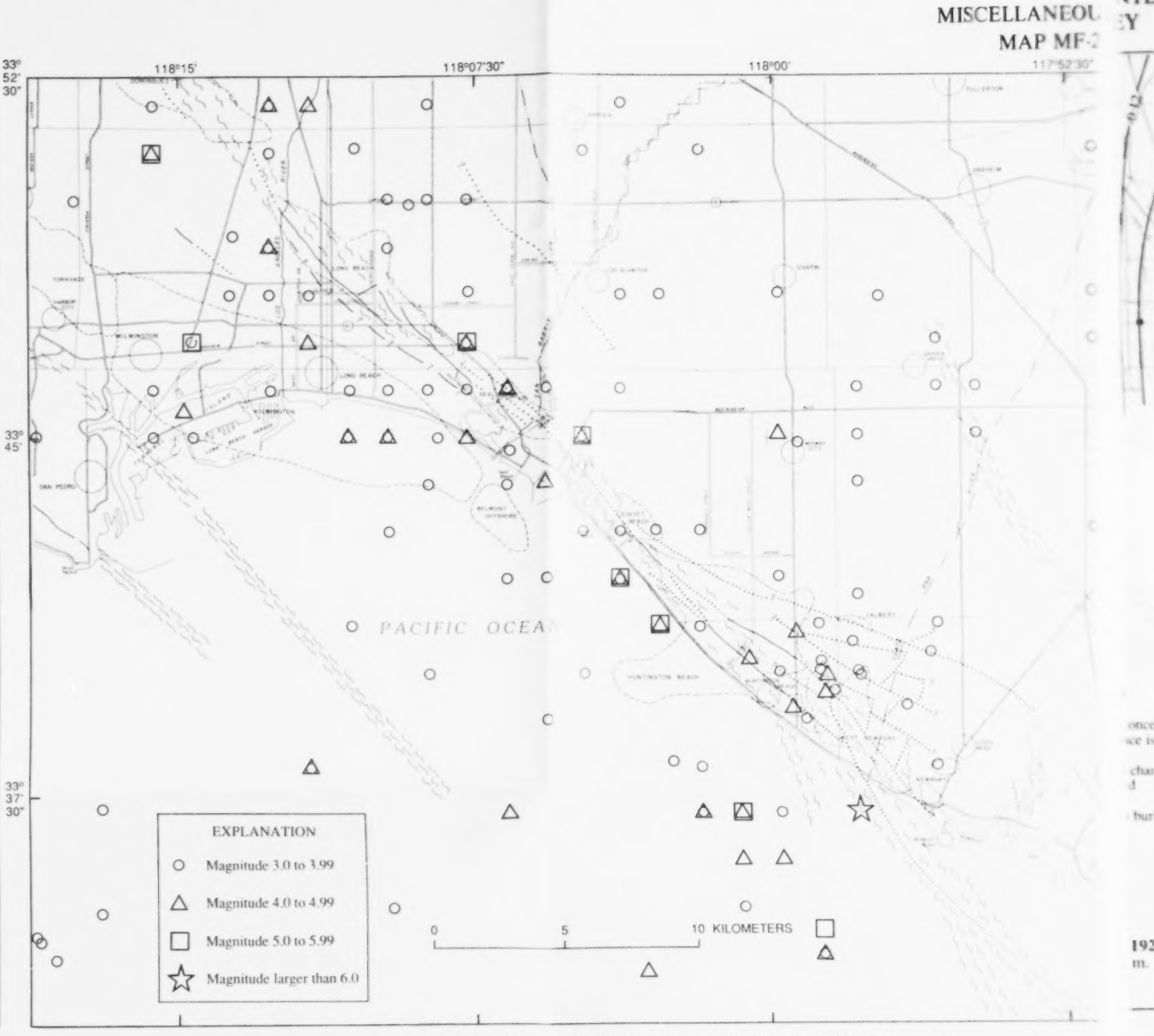
● Bench mark

Map A Cumulative period 1926-32.
Contour interval 0.02 m.



Map D Cumulative period 1933-68.
Contour interval 0.10 m.

MISCELLANEOUS FIELD STUDIES
MAP MF-



EXPLANATION

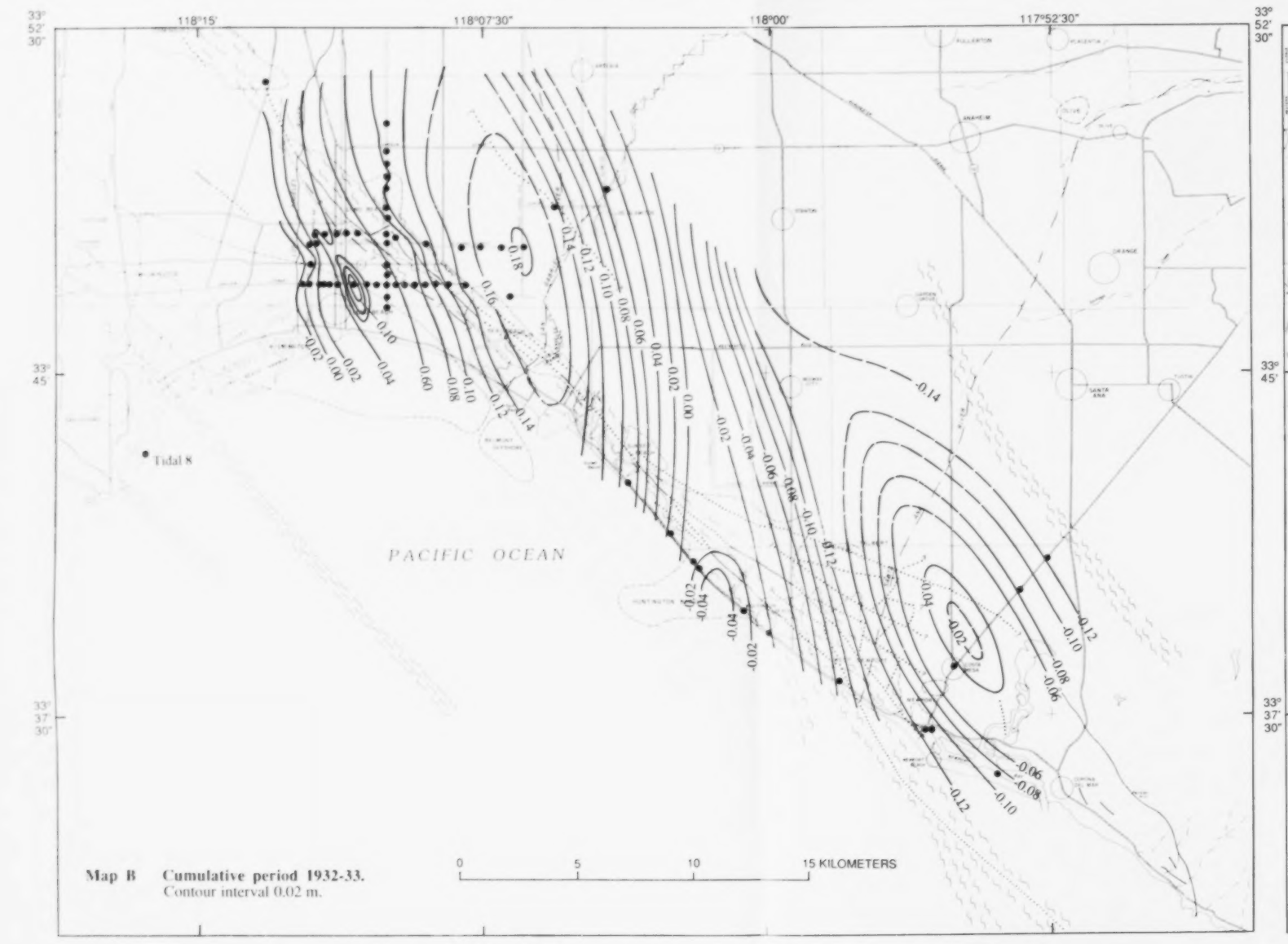
○ Magnitude 3.0 to 3.99

△ Magnitude 4.0 to 4.99

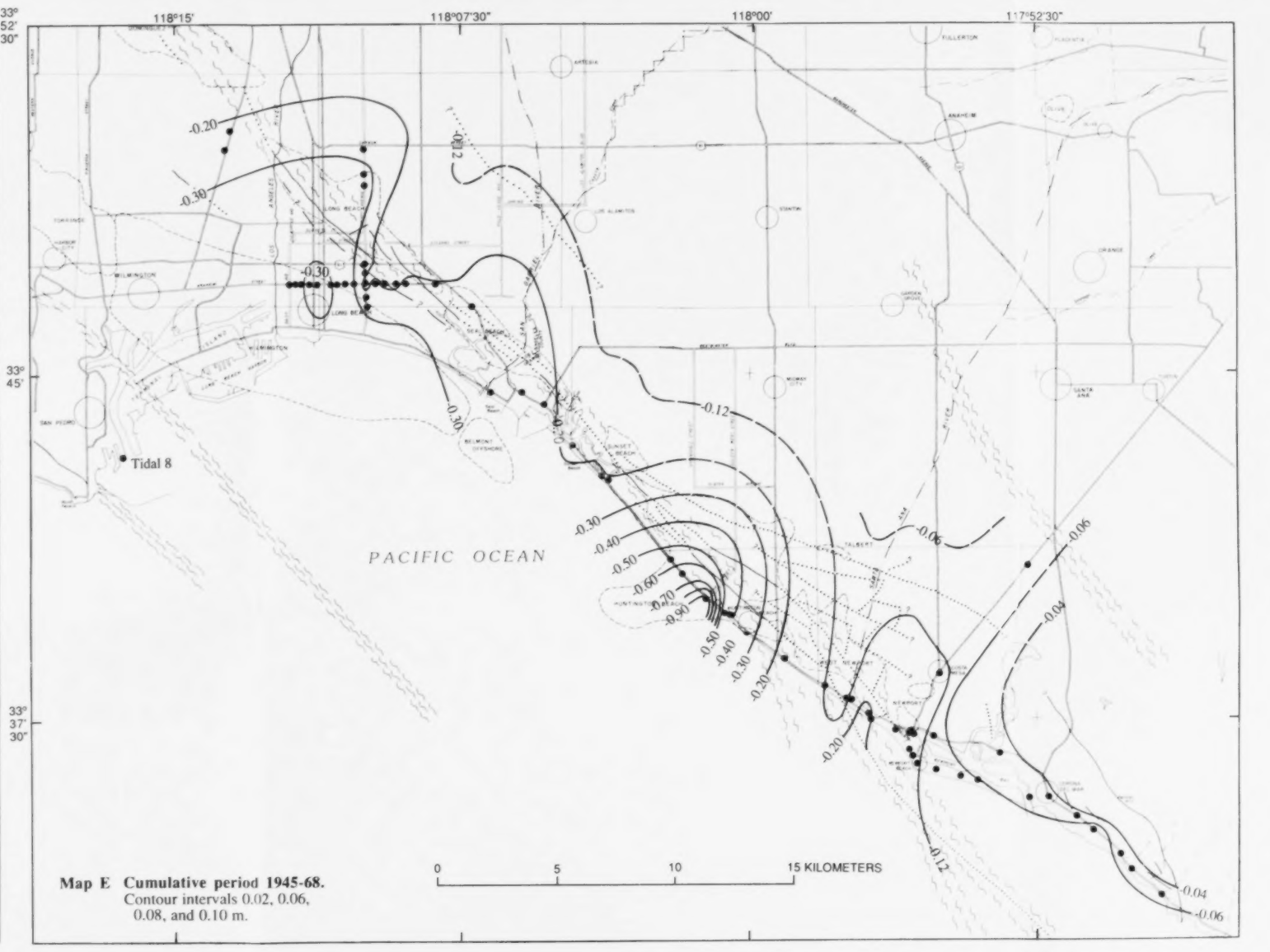
□ Magnitude 5.0 to 5.99

☆ Magnitude larger than 6.0

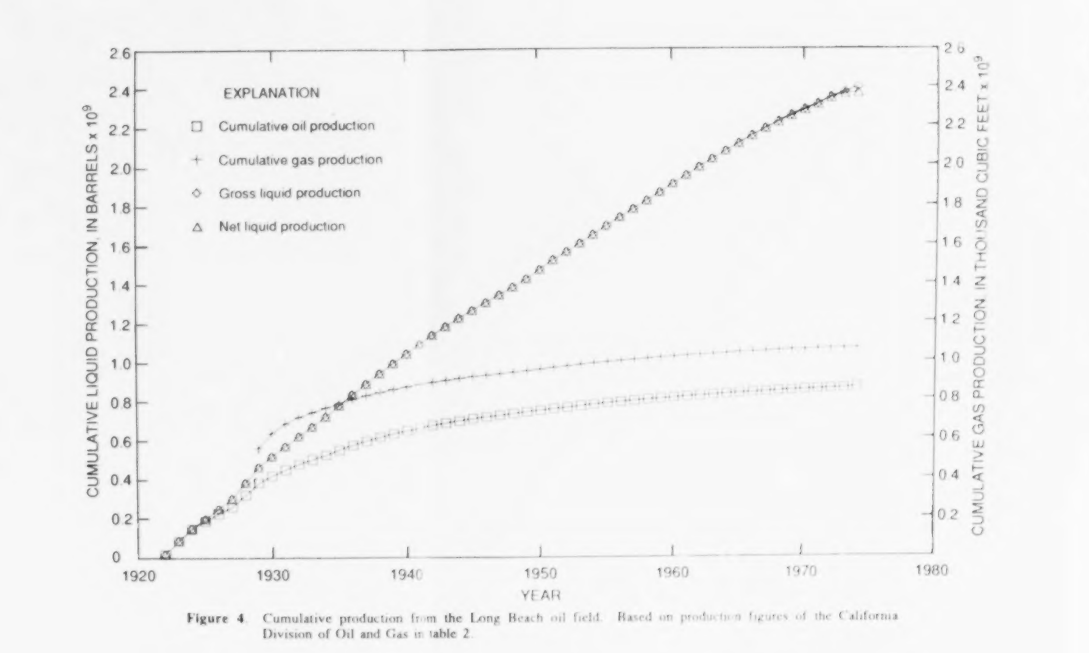
Figure 5. Instrumental seismicity ($M_L \geq 3$) within the area considered in this report, 1932-74. Data supplied by Thomas H. Heaton, U.S. Geological Survey.



Map B Cumulative period 1932-33.
Contour interval 0.02 m.



Map E Cumulative period 1945-68.
Contour intervals 0.02, 0.06, 0.08, and 0.10 m.



EXPLANATION

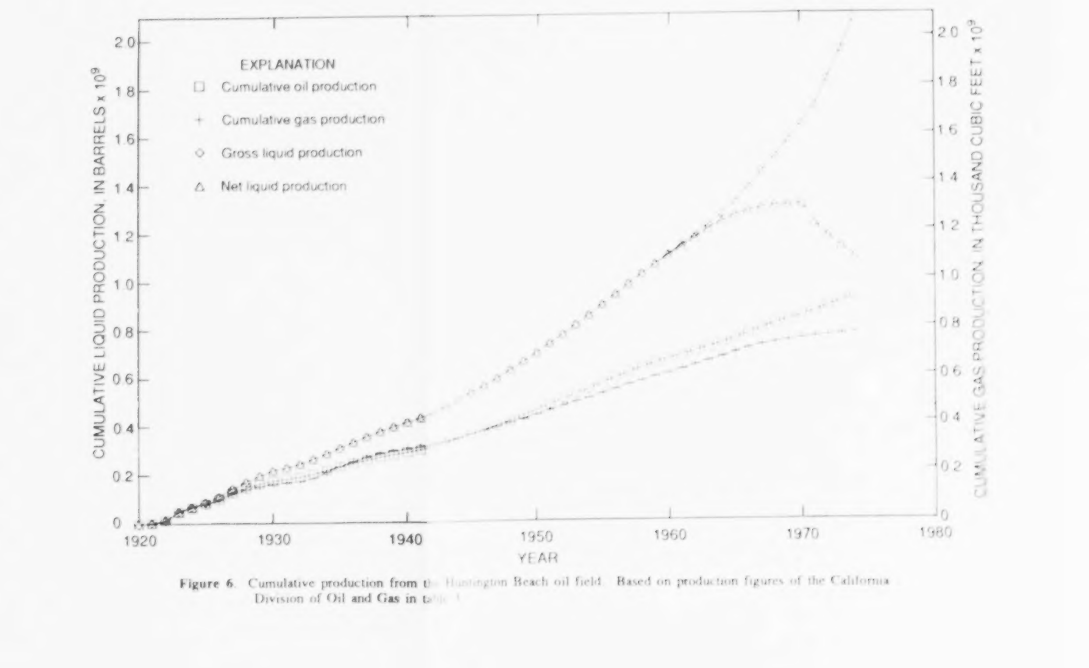
□ Cumulative oil production

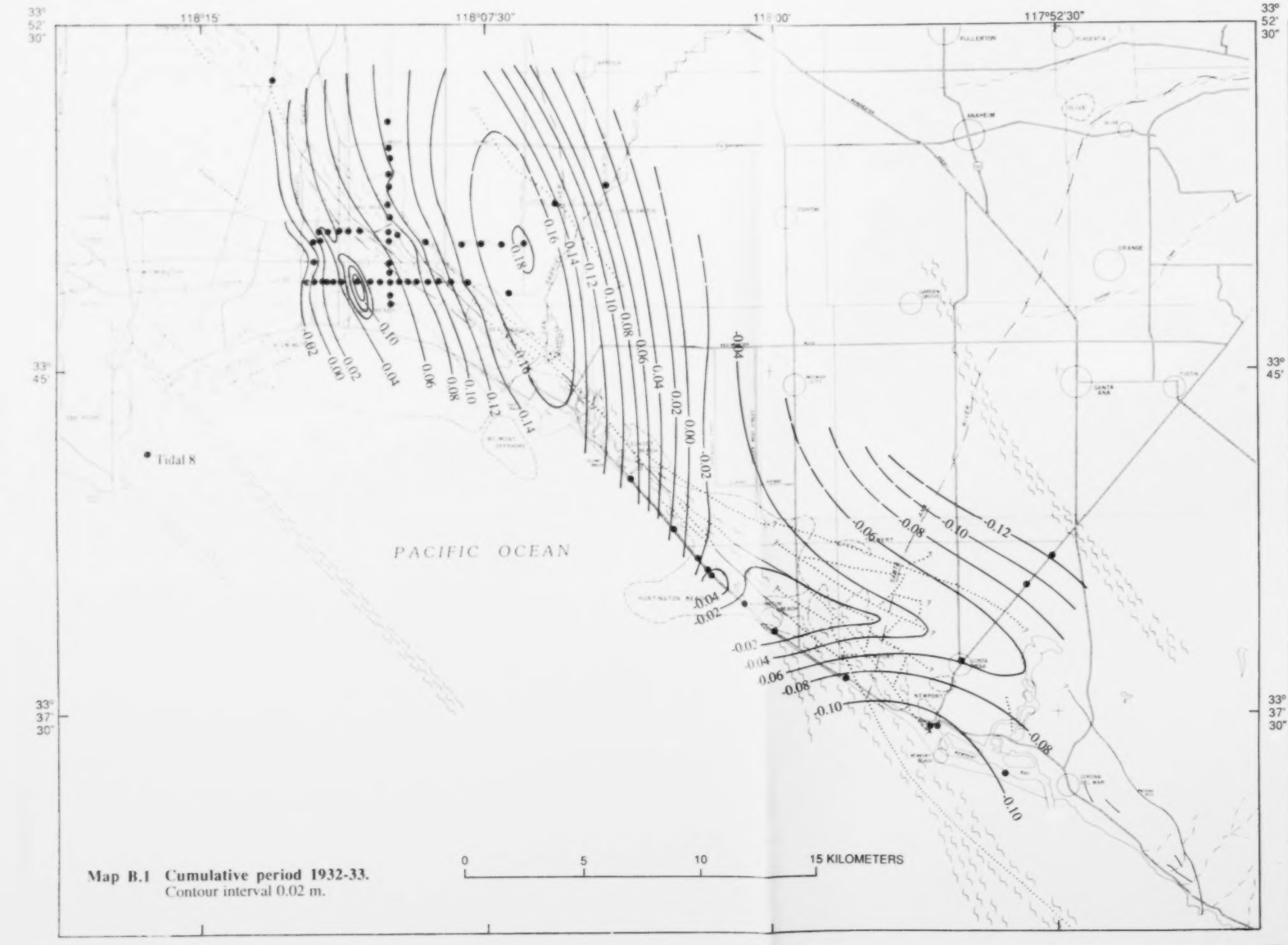
+ Cumulative gas production

◇ Gross liquid production

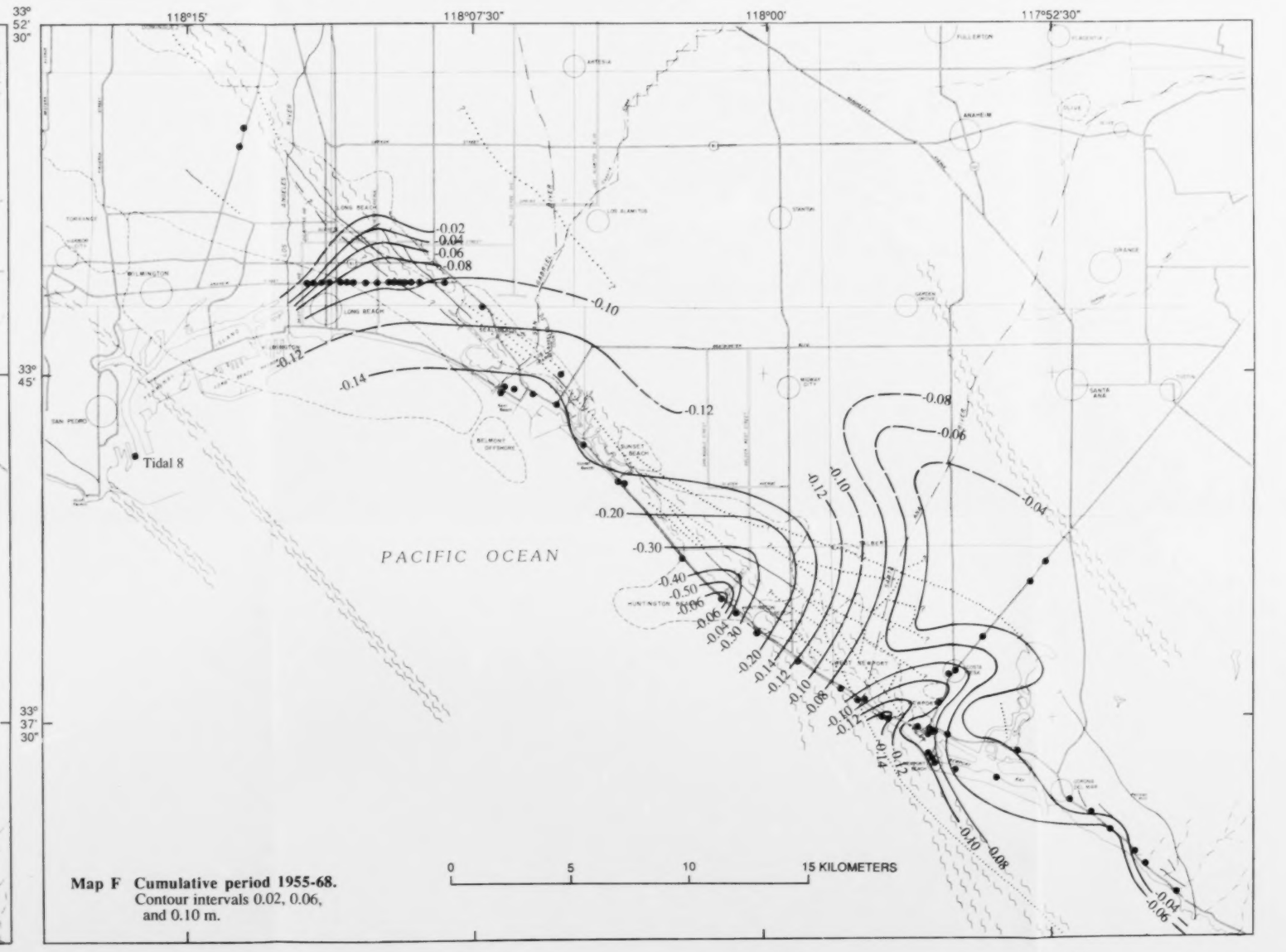
△ Net liquid production

Figure 6. Cumulative production from the Huntington Beach oil field. Based on production figures of the California Division of Oil and Gas ...



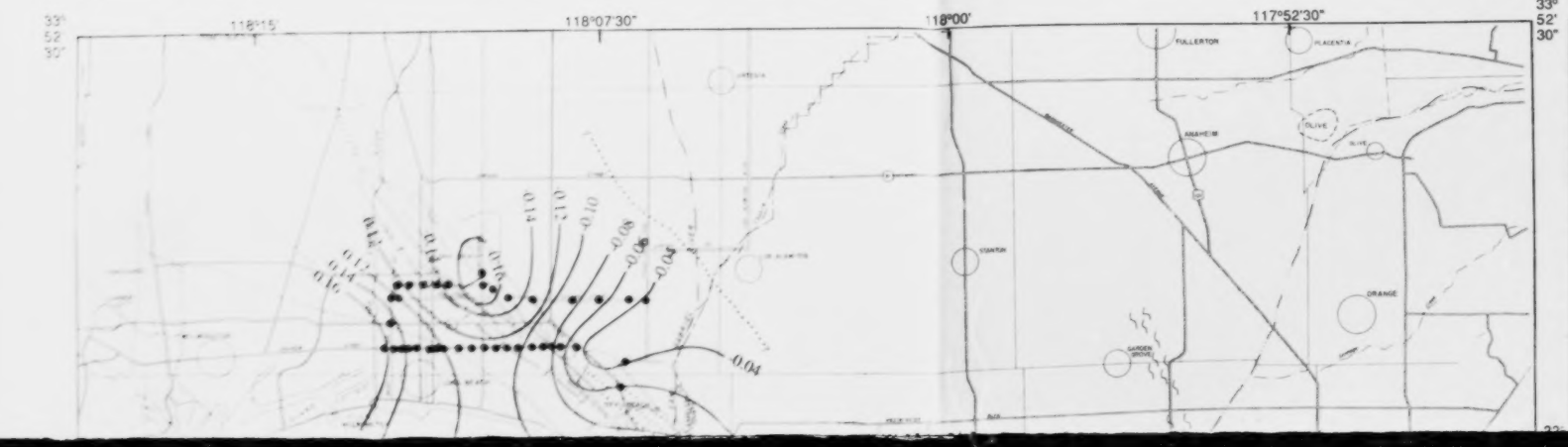


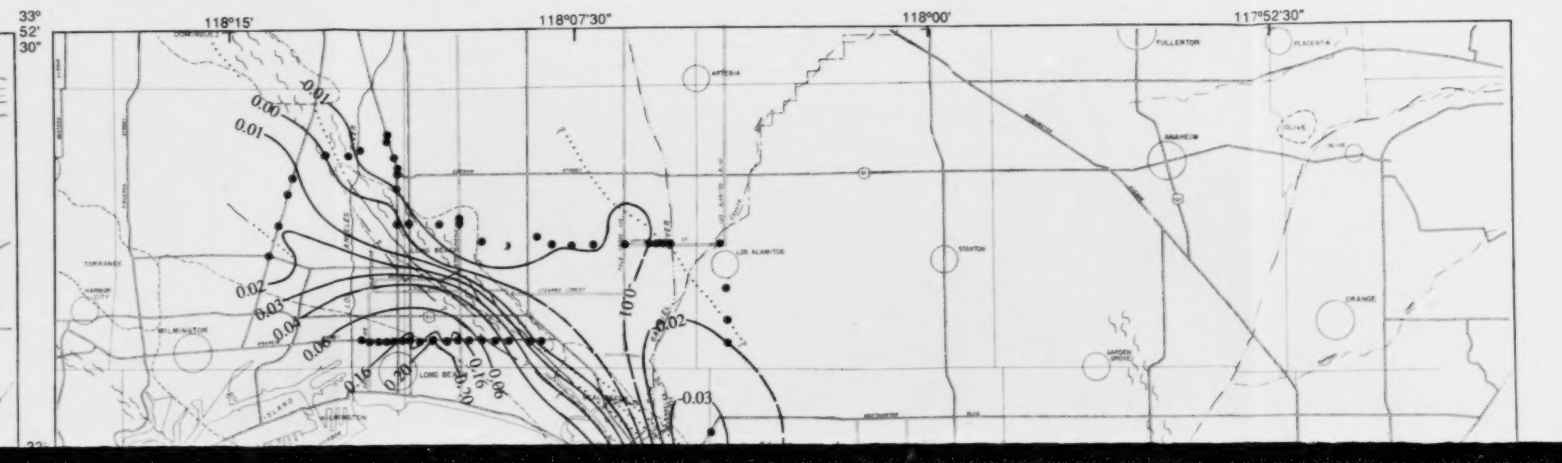
Map B.1 Cumulative period 1932-33.
Contour interval 0.02 m.

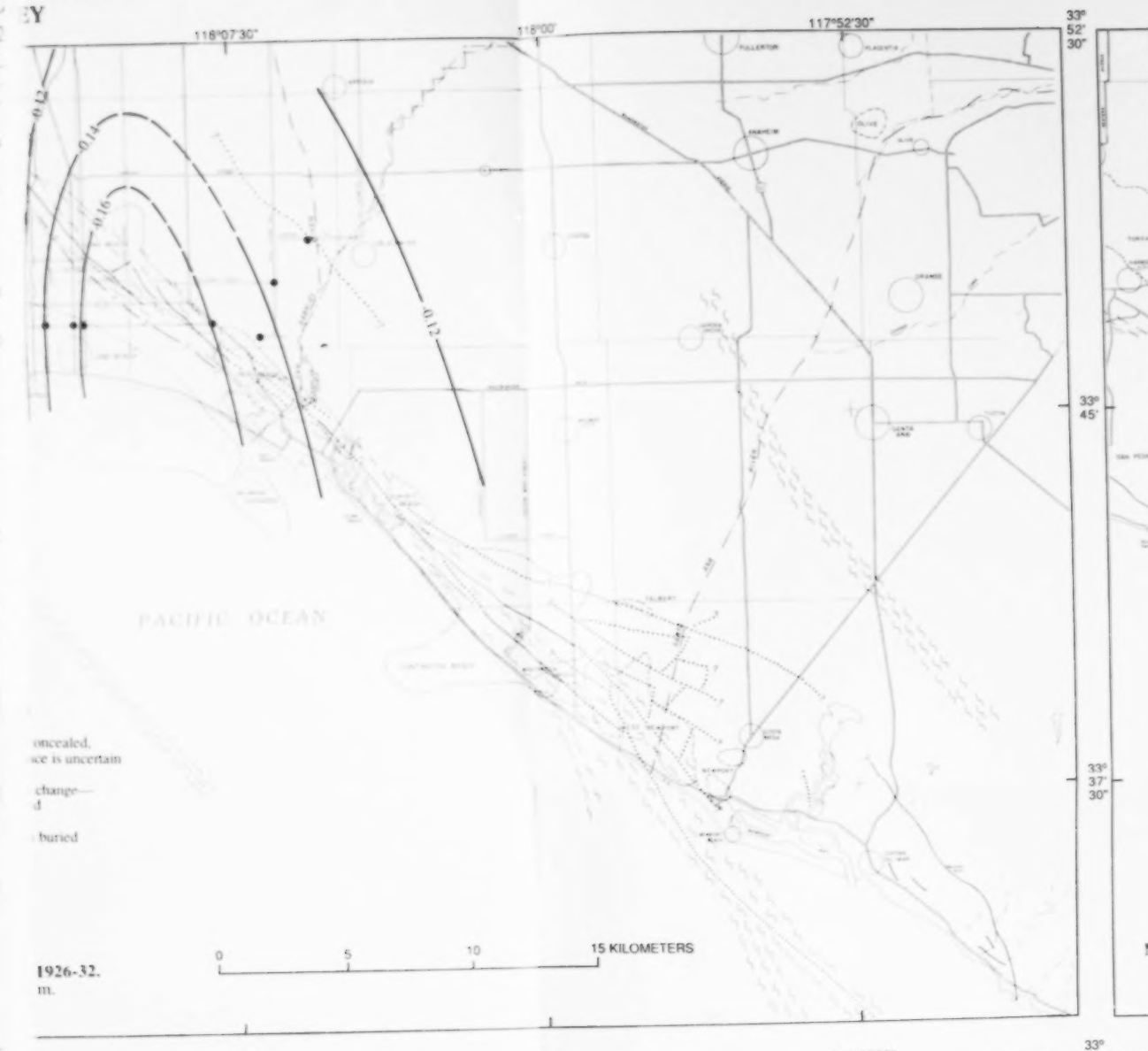


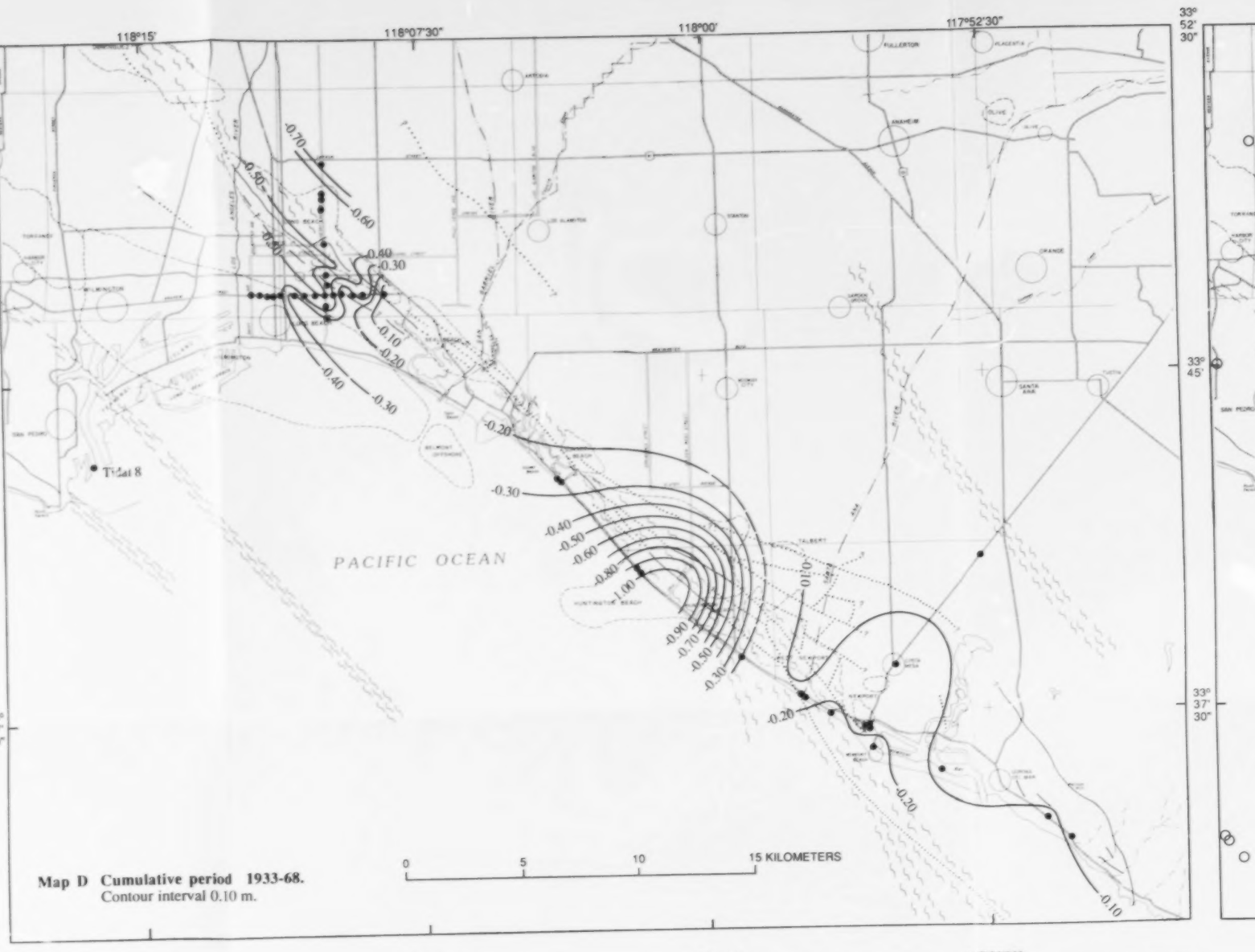
Map F Cumulative period 1955-68.
Contour intervals 0.02, 0.06, and 0.10 m.

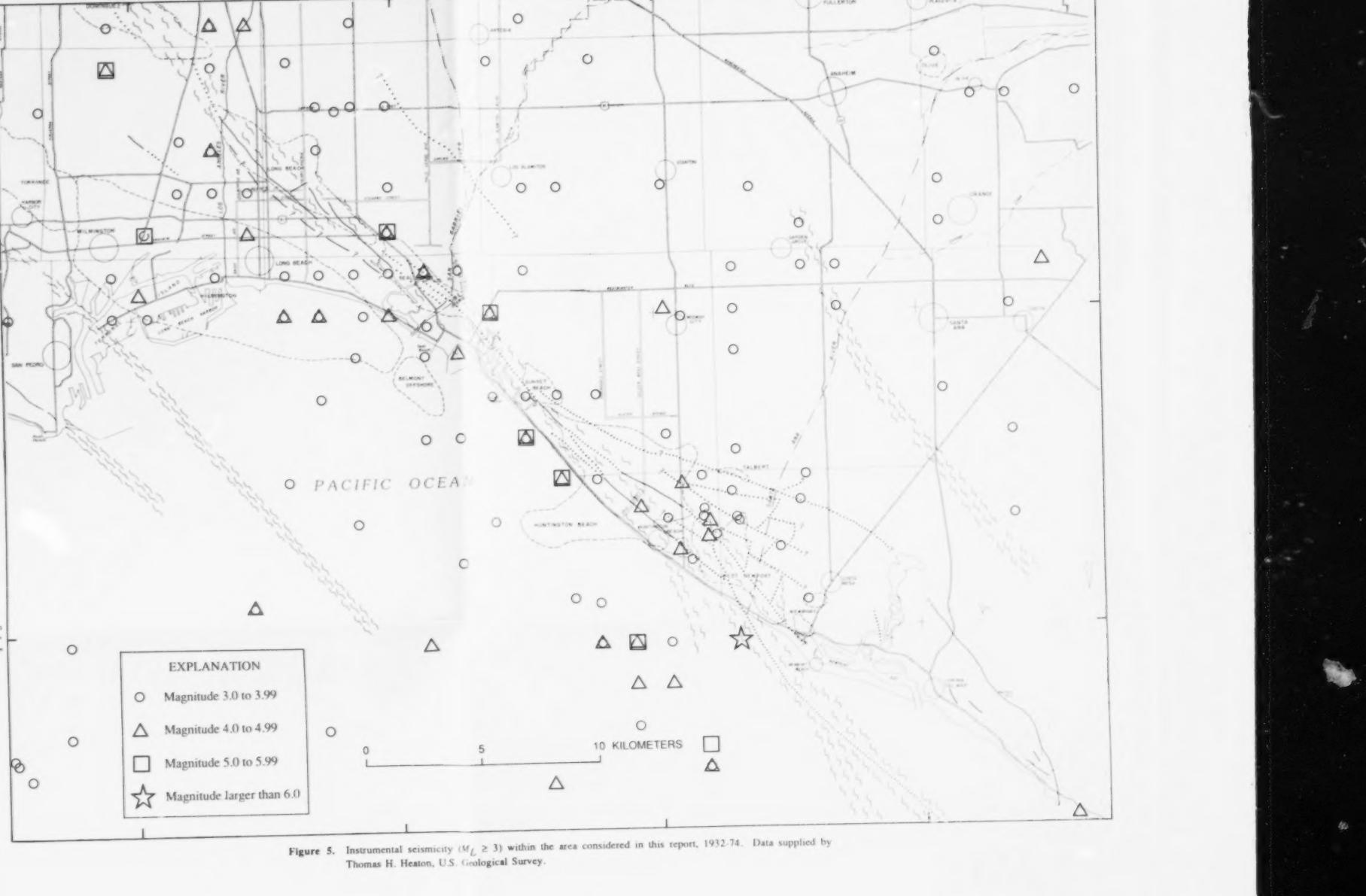
Table 3. Production figures for the Huntington Beach oil field, 1920-74

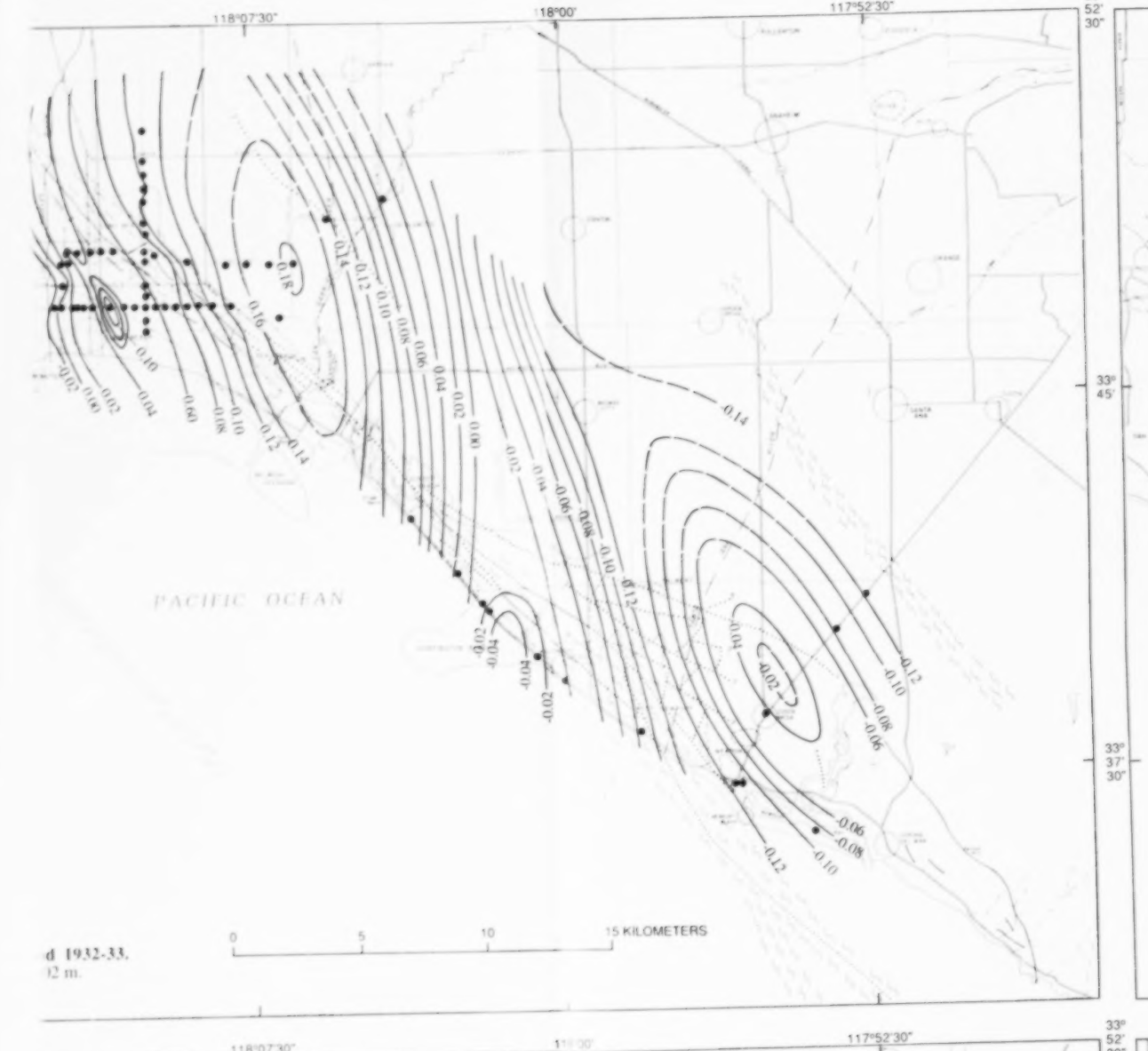


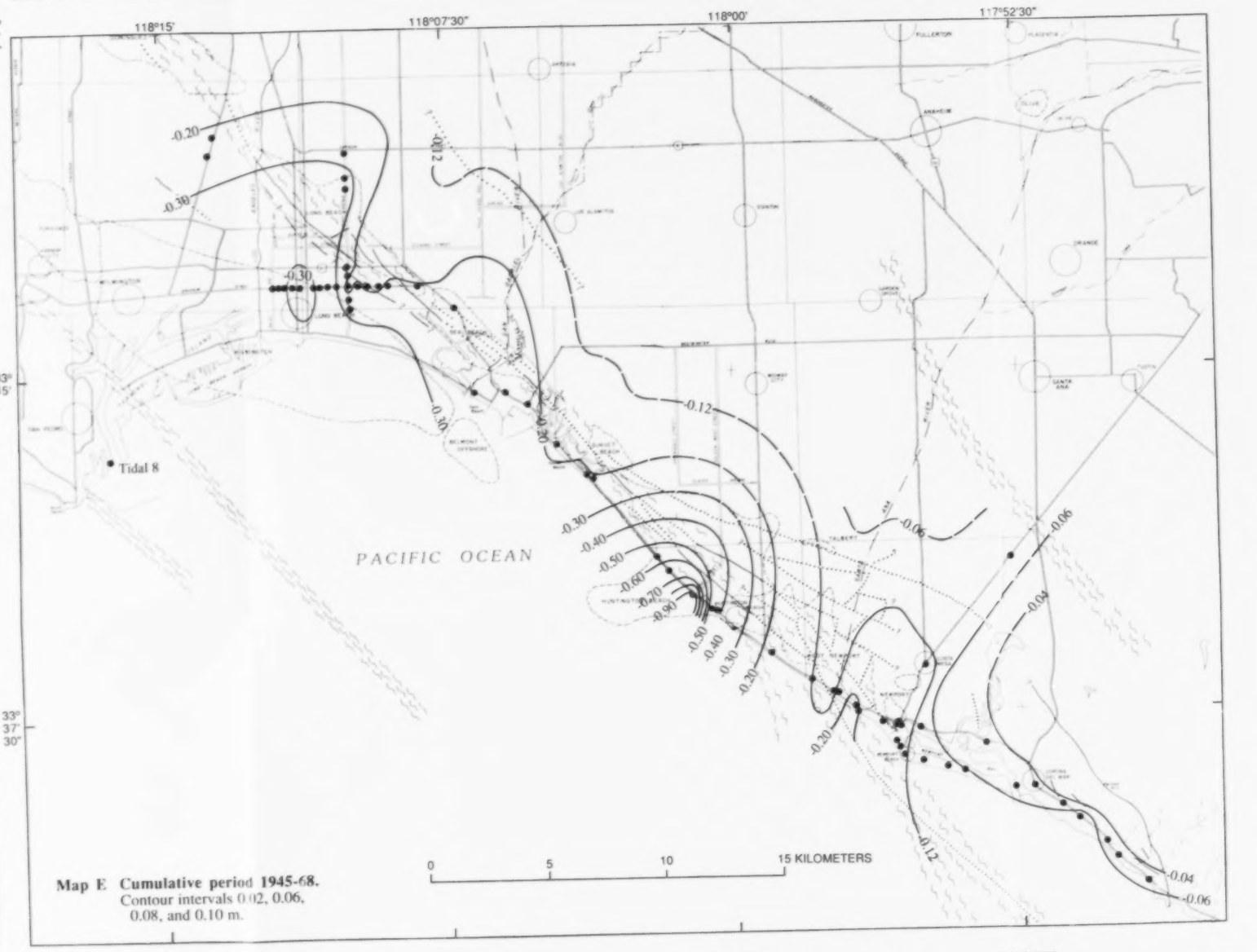


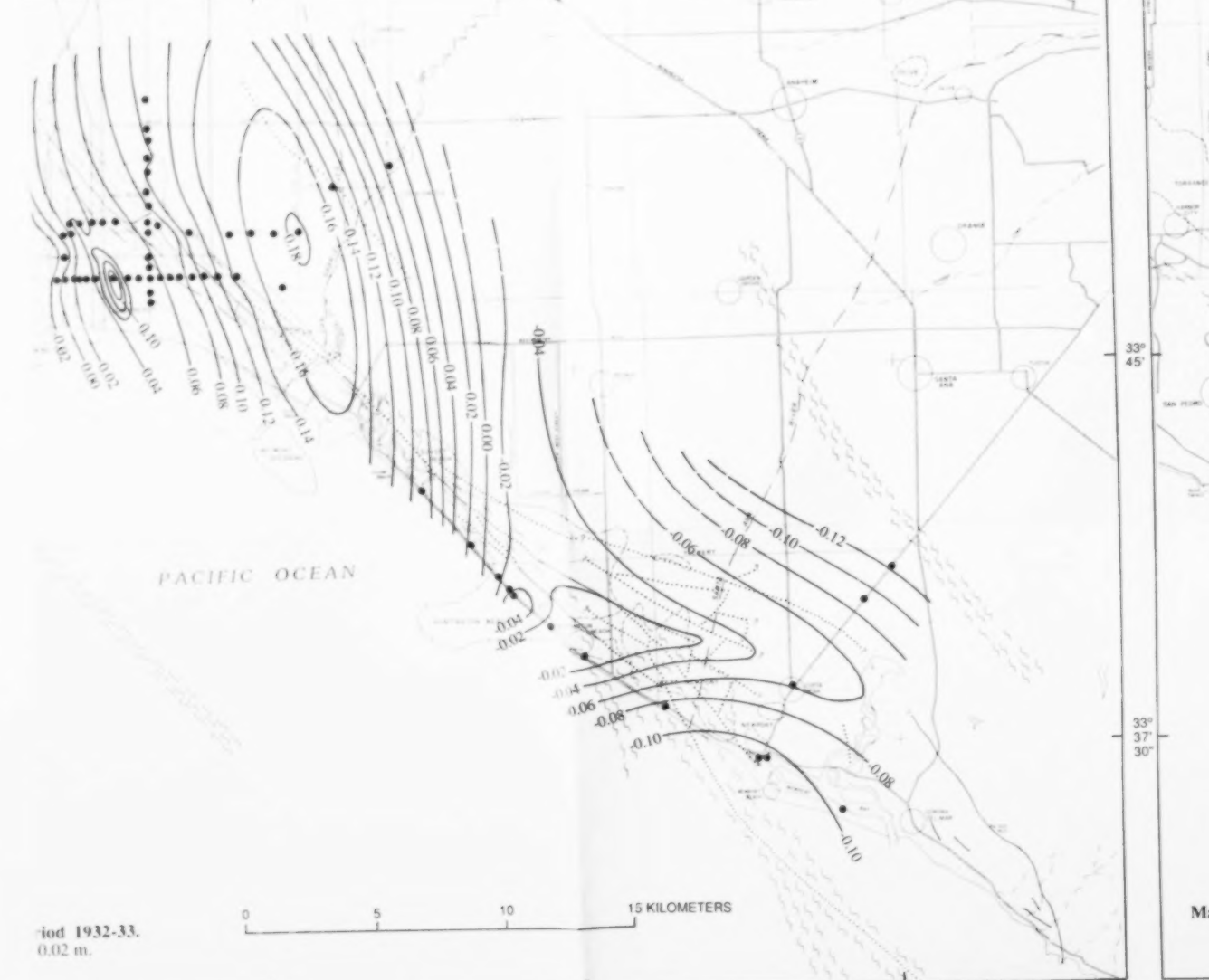


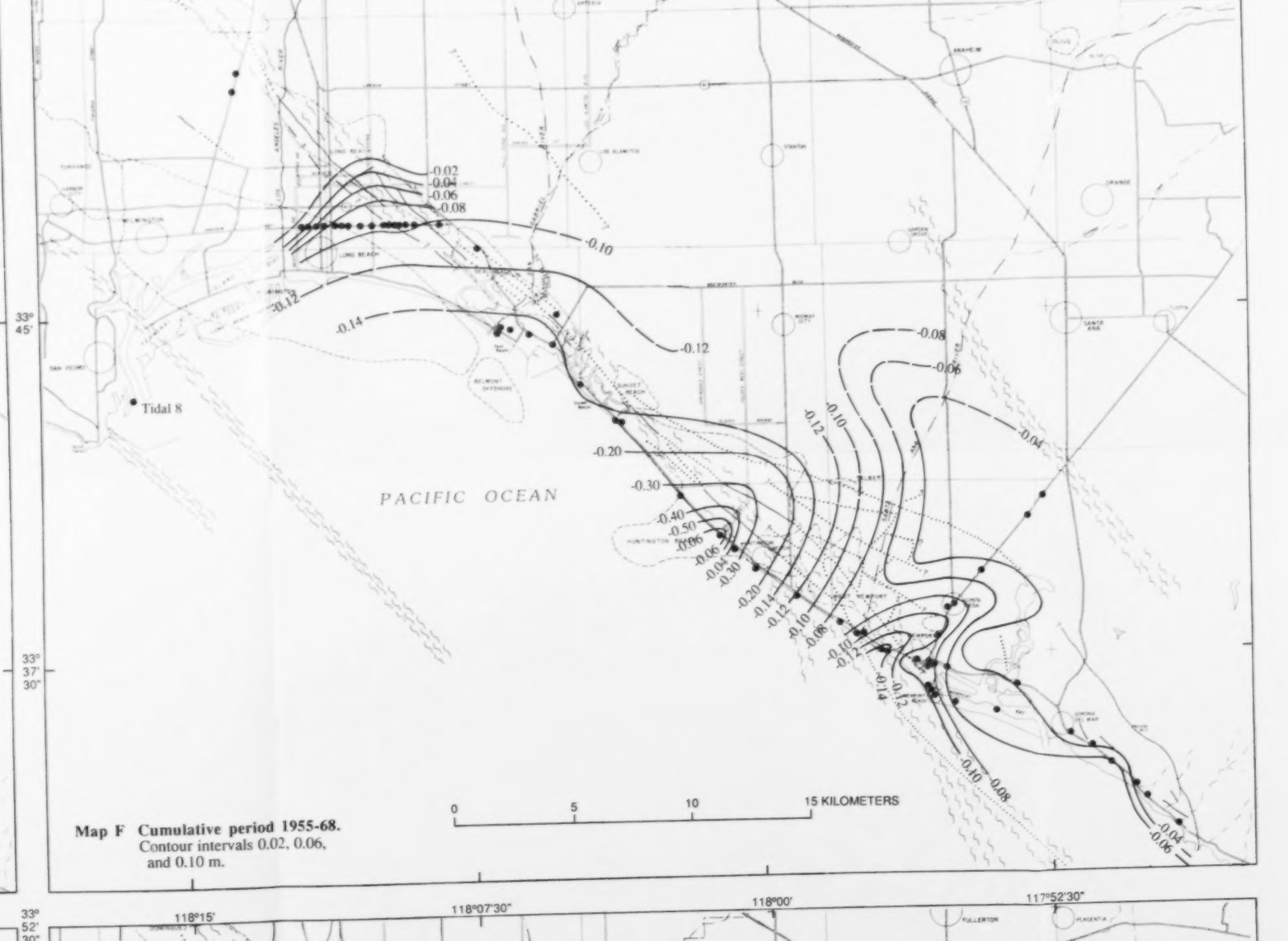


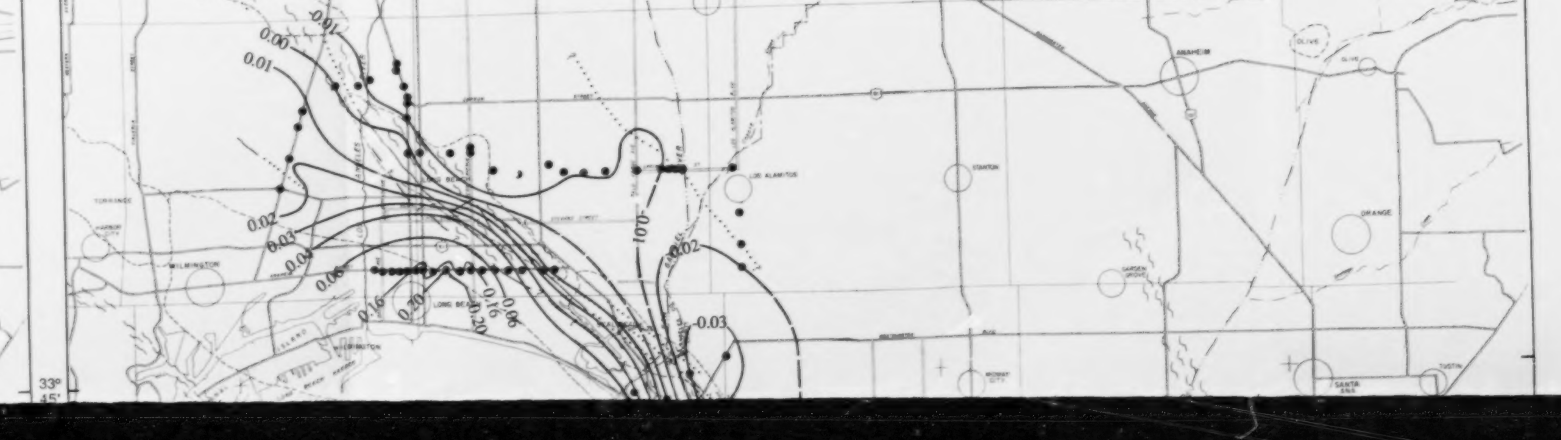


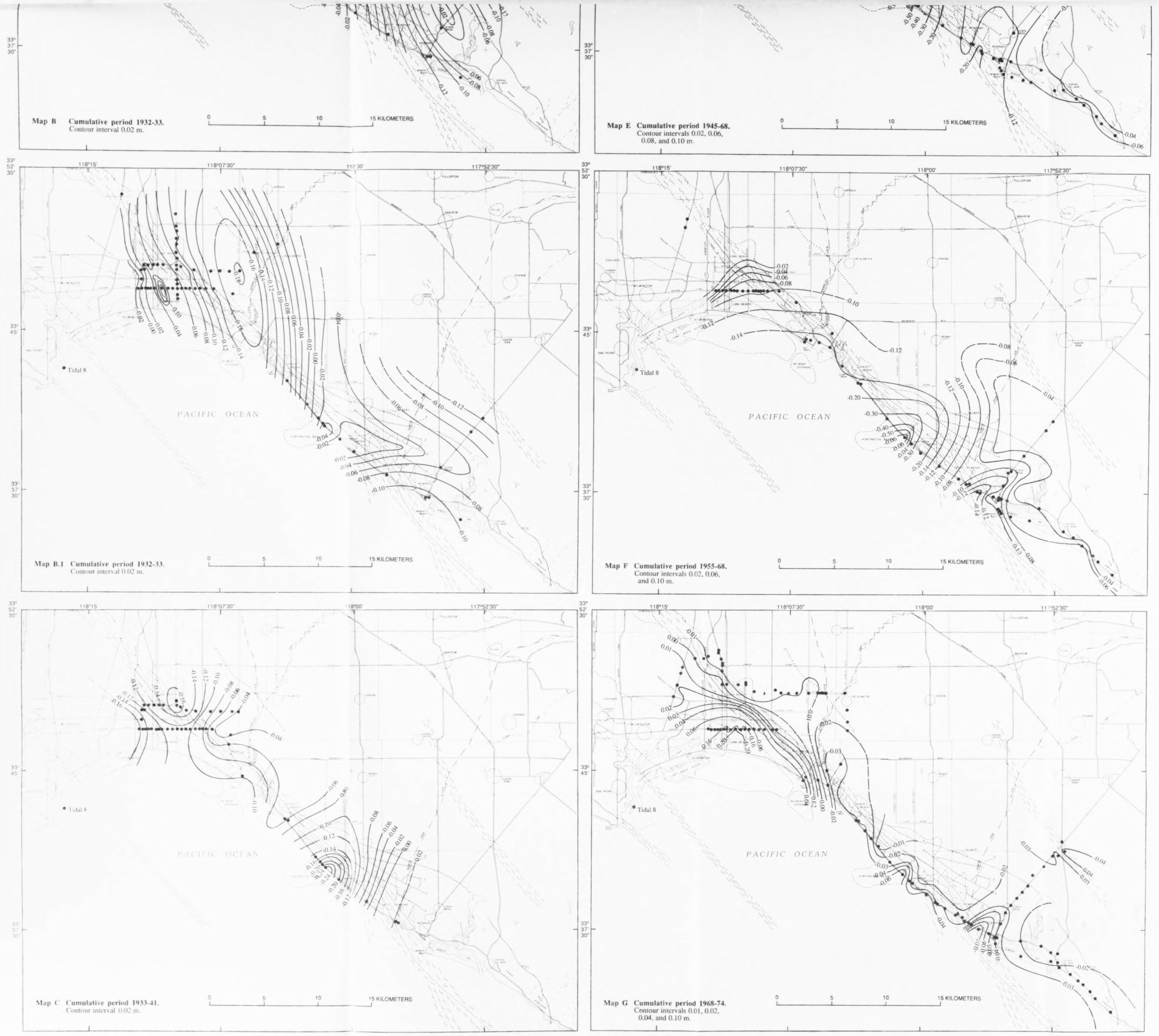












Map B Cumulative period 1932-33.
Contour interval 0.02 m.

Map E Cumulative period 1945-68.
Contour intervals 0.02, 0.06, 0.08, and 0.10 m.

Map B.1 Cumulative period 1932-33.
Contour interval 0.02 m.

Map F Cumulative period 1955-68.
Contour intervals 0.02, 0.06, and 0.10 m.

Map C Cumulative period 1933-41.
Contour interval 0.02 m.

Map G Cumulative period 1968-74.
Contour intervals 0.01, 0.02, 0.04, and 0.10 m.

Figure 3. Height changes during selected periods along a part of the Newport-Inglewood zone of folds and faults, with respect to bench mark Tidal 8.

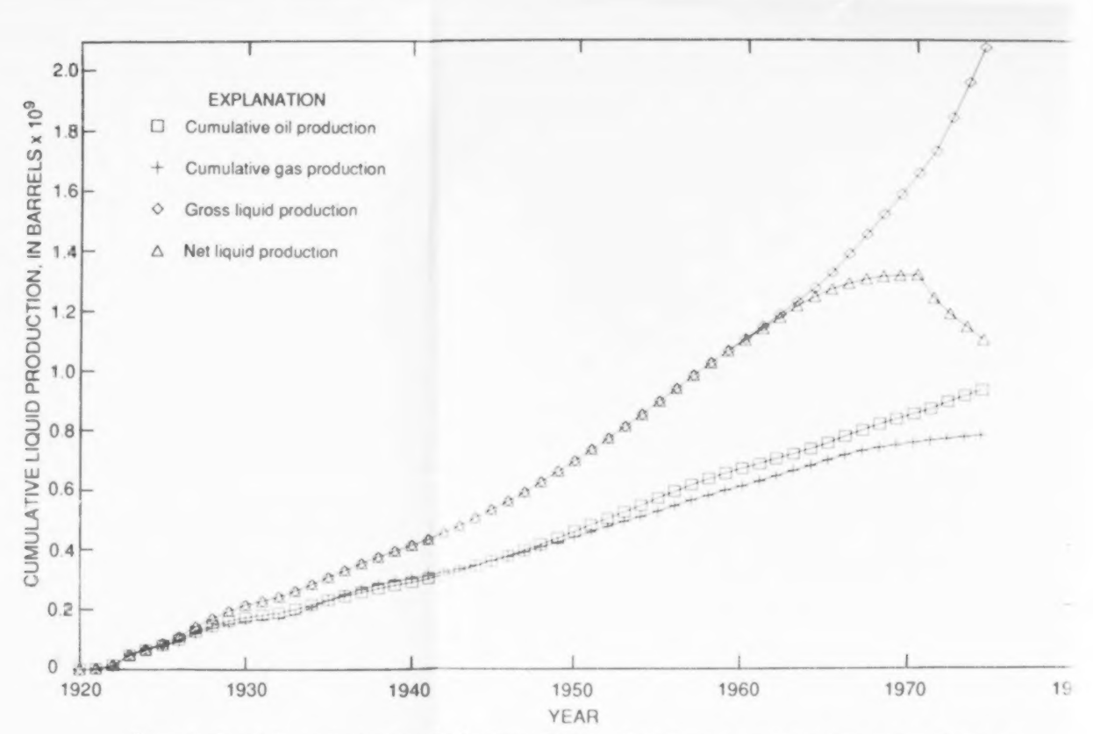


Figure 6. Cumulative production from the Huntington Beach oil field. Based on production figures of the California Division of Oil and Gas in table 3.

Table 2. *Production figures for the Long Beach oil field (exclusive of Recreation Park area), 1921-74*
[Based chiefly on production figures given by Ingram (1968, p. 14). Production figures for 1968 and later years from annual summary reports of the State Oil and Gas Supervisor. 1 bbl=5.615 ft³=0.1590 m³; 1 Mcf=10³ ft³=28.32 m³. Dashes indicate no data or no injection]

Year	Oil production (bbl)	Cumulative oil production (bbl)	Gas production (Mcf)	Cumulative gas production (Mcf)	Water production (bbl)	Gross liquid production (bbl)	Cumulative gross liquid production (bbl)	Water injection (bbl)	Net liquid production (bbl)	Cumulative net liquid production (bbl)
1921	96,636	96,636	---	---	409	97,045	97,045	---	97,045	97,045
1922	19,755,092	19,851,728	---	---	152,760	19,907,852	20,004,897	---	19,907,852	20,004,897
1923	68,323,589	88,175,317	---	---	499,738	68,823,327	88,828,224	---	68,823,327	88,828,224
1924	60,579,819	148,775,136	---	---	2,989,739	63,569,558	152,397,782	---	63,569,558	152,397,782
1925	40,761,433	189,516,569	---	---	8,963,877	49,725,310	202,123,092	---	49,725,310	202,123,092
1926	37,024,901	226,541,470	---	---	13,440,562	50,465,463	252,588,555	---	50,465,463	252,588,555
1927	34,212,727	260,754,197	---	---	16,405,948	50,618,675	303,207,230	---	50,318,675	303,207,230
1928	62,518,460	323,272,657	---	---	19,164,267	81,682,727	384,889,957	---	81,682,727	384,889,957
1929	60,854,191	384,126,848	562,000,000¹/	562,000,000	20,732,712	81,586,903	466,476,860	---	81,586,903	466,476,860
1930	36,772,908	420,899,756	76,100,133	638,100,133	16,994,832	53,767,740	520,244,600	---	53,767,740	520,244,600
1931	30,220,384	451,120,140	49,374,383	687,474,516	20,211,924	50,432,308	570,676,908	---	50,432,308	570,676,908
1932	27,355,735	478,475,875	32,912,127	720,386,643	24,016,778	51,372,513	622,049,421	---	51,372,513	622,049,421
1933	24,210,517	502,686,392	25,238,554	745,625,197	25,569,114	49,779,631	671,829,052	---	49,779,631	671,829,052
1934	22,585,633	525,272,025	20,796,301	766,421,498	28,123,590	50,709,223	722,538,275	---	50,709,223	722,538,275
1935	25,522,035	550,794,060	22,627,170	789,048,668	30,437,719	55,959,754	778,498,029	---	55,959,754	778,498,029
1936	24,258,042	575,052,102	20,944,060	809,992,728	32,574,638	56,832,680	835,330,709	---	56,832,680	835,330,709
1937	21,319,606	596,371,708	17,921,876	827,914,604	32,791,089	54,110,695	889,441,404	---	54,110,695	889,441,404
1938	20,306,107	616,677,815	17,249,942	845,164,546	34,441,367	54,747,474	944,188,878	---	54,747,474	944,188,878
1939	16,682,325	633,360,140	14,832,149	859,996,695	34,164,055	50,846,380	995,035,258	---	50,846,380	995,035,258
1940	15,749,533	649,109,673	13,590,928	873,587,623	34,028,548	49,778,081	1,044,813,339	---	49,778,081	1,044,813,339
1941	14,469,451	663,579,124	12,354,623	885,942,246	34,135,578	48,605,029	1,093,418,368	---	48,605,029	1,093,418,368
1942	12,959,997	676,539,121	11,110,855	897,053,101	33,581,693	46,541,690	1,139,960,058	---	46,541,690	1,139,960,058
1943	11,583,944	688,123,065	9,940,346	906,993,447	32,031,441	43,615,385	1,183,575,443	---	43,615,385	1,183,575,443
1944	10,801,193	698,924,258	9,218,395	916,211,842	30,844,861	41,646,054	1,225,221,497	---	41,646,054	1,225,221,497
1945	9,797,091	708,721,349	8,234,846	924,446,688	30,510,288	40,307,379	1,265,528,876	---	40,307,379	1,265,528,876
1946	9,042,873	717,764,222	7,648,014	932,094,702	29,790,093	38,832,966	1,304,361,842	---	38,832,966	1,304,361,842
1947	8,551,257	726,315,479	7,253,709	939,348,411	31,460,894	40,012,151	1,344,373,993	---	40,012,151	1,344,373,993
1948	8,143,065	734,449,544	6,761,093	946,109,504	30,684,501	38,818,566	1,383,192,559	---	38,818,566	1,383,192,559
1949	8,307,578	742,757,122	7,207,737	953,317,241	32,282,571	40,590,149	1,423,782,708	---	40,590,149	1,423,782,708
1950	8,347,060	751,104,182	7,505,492	960,822,733	39,646,411	47,993,471	1,471,776,179	---	47,993,471	1,471,776,179
1951	8,418,661	759,522,843	9,568,270	970,391,003	41,708,274	50,126,935	1,521,903,114	---	50,126,935	1,521,903,114
1952	7,909,601	767,432,444	8,855,550	979,246,553	34,171,998	42,081,599	1,563,984,713	---	42,081,599	1,563,984,713
1953	7,356,456	774,788,900	7,130,364	986,376,917	35,918,649	43,275,105	1,607,259,818	---	43,275,105	1,607,259,818
1954	7,053,437	781,842,337	6,662,484	993,039,401	36,594,540	43,647,977	1,650,907,795	---	43,647,977	1,650,907,795
1955	6,626,543	788,468,880	6,232,611	999,272,012	37,896,966	44,523,509	1,695,431,304	---	44,523,509	1,695,431,304
1956	6,255,446	794,724,326	5,911,922	1,005,183,934	37,370,446	43,625,892	1,739,057,196	---	43,625,892	1,739,057,196
1957	5,844,820	800,569,146	5,672,517	1,010,856,451	36,600,410	42,445,230	1,781,502,426	---	42,445,230	1,781,502,426
1958	5,475,868	806,045,014	5,281,463	1,016,137,914	37,982,534	43,458,402	1,824,960,828	---	43,458,402	1,824,960,828
1959	5,248,089	811,293,103	5,068,725	1,021,206,639	36,813,460	42,061,549	1,867,022,377	---	42,061,549	1,867,022,377
1960	5,083,826	816,376,929	4,848,604	1,026,055,243	38,355,641	43,439,467	1,910,461,844	---	43,439,467	1,910,461,844
1961	4,823,074	821,200,003	4,534,249	1,030,589,492	38,120,636	42,943,710	1,953,405,554	---	42,943,710	1,953,405,554
1962	4,680,251	825,880,254	4,304,914	1,034,894,406	36,985,855	41,666,106	1,995,071,660	---	41,666,106	1,995,071,660
1963	4,472,685	830,352,939	4,247,997	1,039,142,403	37,048,883	41,521,568	2,036,593,228	---	41,521,568	2,036,593,228
1964	4,226,722	834,579,661	4,059,381	1,043,201,784	36,217,726	40,444,448	2,077,037,676	483,928	39,960,520	2,076,553,748
1965	4,041,785	838,621,446	3,728,721	1,046,930,505	35,430,707	39,472,492	2,116,510,168	593,081	38,879,411	2,115,433,159
1966	3,922,617	842,544,063	3,747,123	1,050,677,628	34,810,658	38,733,275	2,155,243,443	335,840	38,397,435	2,153,830,594
1967	3,812,686	846,356,749	3,417,699	1,054,095,327	33,947,935	37,760,621	2,193,004,064	778,364	36,982,257	2,190,812,851
1968	3,632,097	849,988,846	3,113,639	1,057,208,966	31,041,270	34,673,367	2,227,677,431	775,041	33,898,326	2,224,711,177
1969	3,391,216	853,380,062	2,815,383	1,060,024,349	28,455,641	31,846,857	2,259,524,288	756,899	31,089,958	2,255,801,135
1970	3,146,611	856,526,673	2,406,866	1,062,431,215	27,290,710	30,437,321	2,289,961,609	495,574	29,941,747	2,285,742,882
1971	2,973,942	859,500,615	2,270,258	1,064,701,473	25,607,752	28,581,694	2,318,543,303	433,399	28,148,295	2,313,891,177
1972	2,728,362	862,228,977	1,972,309	1,066,673,782	30,838,635	33,566,997	2,352,110,300	517,168	33,049,829	2,346,941,006
1973	2,541,538	864,770,515	1,651,646	1,068,325,428	23,481,286	26,022,824	2,378,133,124	3,938,325	22,084,499	2,369,025,505
1974	2,462,464	867,232,979	1,477,781	1,069,803,209	22,929,595	25,392,059	2,403,525,183	20,651,182²/	4,740,877	2,373,766,382

¹/Cumulative figure, 1921-29
²/Adjusted to agree with 1974 corrected cumulative figure

Table 3. *Production figures for the Huntington Beach oil field, 1920-74*
[Based chiefly on production figures given by Hazenbush and Allen (1958, p. 25). Production figures for 1958 and later years from annual summary reports of the State Oil and Gas Supervisor. 1 bbl=5.615 ft³=0.1590 m³; 1 Mcf=10³ ft³=28.32 m³. Dashes indicate no injection or disposal, parentheses indicate negative values]

Year	Oil production (bbl)	Cumulative oil production (bbl)	Gas production (Mcf)	Cumulative gas production (Mcf)	Water production (bbl)	Gross liquid production (bbl)	Cumulative gross liquid production (bbl)	Water injection (bbl)	Water disposal (bbl)	Steam injection (bbl)	Net liquid production (bbl)	Cumulative net liquid production (bbl)
1920	43,256	43,256	no record	no record	2,764	46,020	46,020	—	—	—	46,020	46,020
1921	2,558,226	2,601,482	1,800,000	1,800,000	656,939	3,215,165	3,261,185	—	—	—	3,215,165	3,261,185
1922	11,179,882	13,781,364	6,400,000	8,200,000	266,576	11,446,458	14,707,643	—	—	—	11,446,458	14,707,643
1923	33,813,185	47,594,549	41,000,000	49,200,000	786,533	34,599,718	49,307,361	—	—	—	34,599,718	49,307,361
1924	17,335,933	64,930,482	20,000,000	69,200,000	1,560,439	18,896,372	68,203,733	—	—	—	18,896,372	68,203,733
1925	16,303,732	81,234,214	9,600,000	78,800,000	2,698,868	19,002,600	87,206,333	—	—	—	19,002,600	87,206,333
1926	19,248,712	100,482,926	14,000,000	92,800,000	4,149,841	23,398,553	110,604,886	—	—	—	23,398,553	110,604,886
1927	26,364,399	126,847,325	27,800,000	120,600,000	6,432,180	32,796,579	143,401,465	—	—	—	32,796,579	143,401,465
1928	19,652,977	146,500,302	18,400,000	139,000,000	7,914,887	27,567,864	170,969,329	—	—	—	27,567,864	170,969,329
1929	15,948,523	162,448,825	13,600,000	152,600,000	9,009,491	24,958,014	195,927,343	—	—	—	24,958,014	195,927,343
1930	11,210,461	173,659,286	9,400,000	162,000,000	8,171,935	19,382,396	215,309,739	—	—	—	19,382,396	215,309,739
1931	7,755,457	181,414,743	5,970,670	167,970,670	6,193,487	13,948,944	229,258,683	—	—	—	13,948,944	229,258,683
1932	7,924,081	189,338,824	4,505,195	172,475,865	6,396,573	14,320,654	243,579,337	—	—	—	14,320,654	243,579,337
1933	12,931,517	202,270,341	11,874,545	184,350,410	6,379,593	19,311,110	262,890,447	—	—	—	19,311,110	262,890,447
1934	15,081,047	217,351,388	24,666,700	209,017,110	7,789,992	22,871,039	285,761,486	—	—	—	22,871,039	285,761,486
1935	15,037,641	232,389,029	22,886,595	231,903,705	8,787,928	23,825,569	309,587,055	—	—	—	23,825,569	309,587,055
1936	13,206,708	245,595,737	19,948,710	251,852,415	9,190,286	22,396,994	331,984,049	—	—	—	22,396,994	331,984,049
1937	13,151,936	258,747,673	17,511,970	269,364,385	10,160,179	23,312,115	355,296,164	—	—	—	23,312,115	355,296,164
1938	11,894,391	270,642,064	14,447,795	283,812,180	9,160,220	21,054,611	376,350,775	—	—	—	21,054,611	376,350,775
1939	9,925,128	280,567,192	10,514,190	294,326,370	9,035,177	18,960,305	395,311,080	—	—	—	18,960,305	395,311,080
1940	9,495,775	290,062,967	8,171,620	302,497,990	8,786,758	18,282,533	413,593,613	—	—	—	18,282,533	413,593,613
1941	10,695,967	300,758,934	9,248,005	311,745,995	7,992,546	18,688,513	432,282,126	—	—	—	18,688,513	432,282,126
1942	12,000,119	312,759,053	10,727,945	322,473,940	9,518,035	21,518,154	453,800,280	—	—	—	21,518,154	453,800,280
1943	13,196,898	325,955,951	11,294,240	333,768,180	10,232,441	23,429,339	477,229,619	—	—	—	23,429,339	477,229,619
1944	17,146,873	343,102,824	13,405,492	347,173,672	10,813,383	27,960,256	505,189,875	—	—	—	27,960,256	505,189,875
1945	17,603,882	360,706,706	14,498,722	361,672,394	10,971,713	28,575,595	533,765,470	—	—	—	28,575,595	533,765,470
1946	17,085,965	377,792,671	14,041,594	375,713,988	10,875,981	27,961,946	561,727,416	—	—	—	27,961,946	561,727,416
1947	18,288,617	396,081,288	15,249,137	390,963,125	11,848,621	30,137,238	591,864,654	—	—	—	30,137,238	591,864,654
1948	20,796,011	416,877,299	16,959,040	407,922,165	13,497,451	34,293,462	626,158,116	—	—	—	34,293,462	626,158,116
1949	21,016,923	437,894,222	16,662,342	424,584,507	13,793,006	34,809,929	660,968,045	—	—	—	34,809,929	660,968,045
1950	20,520,019	458,414,241	15,645,830	440,230,337	14,240,906	34,760,925	695,728,970	—	—	—	34,760,925	695,728,970
1951	22,446,785	480,861,026	17,860,138	458,090,475	15,400,635	37,847,420	733,576,390	—	—	—	37,847,420	733,576,390
1952	21,812,853	502,673,879	17,716,431	475,806,906	16,230,558	38,043,411	771,619,801	—	—	—	38,043,411	771,619,801
1953	21,273,012	523,946,891	16,273,307	492,080,213	17,227,181	38,500,193	810,119,994	—	—	—	38,500,193	810,119,994
1954	21,617,904	545,564,795	15,871,689	507,951,902	18,085,385	39,703,289	849,823,283	—	—	—	39,703,289	849,823,283
1955	24,193,498	569,758,293	18,785,822	526,737,724	19,218,890	43,412,388	893,235,671	—	—	—	43,412,388	893,235,671
1956	22,466,653	592,224,946	17,610,566	544,348,290	20,368,446	42,835,099	936,070,770	—	—	—	42,835,099	936,070,770
1957	21,483,210	613,708,156	18,196,645	562,544,935	21,580,646	43,063,856	979,134,626	—	—	—	43,063,856	979,134,626
1958	19,417,203	633,125,359	15,696,825	578,241,760	21,850,310	41,267,513	1,020,402,139	—	16,128	—	41,251,385	1,020,386,011
1959	18,096,398	651,221,757	16,300,665	594,542,425	22,202,181	40,298,579	1,060,700,718	900,744¹/	60,748	—	39,337,087	1,059,723,098
1960	16,550,182	667,771,939	14,391,443	608,933,868	22,382,703	38,932,885	1,099,633,603	3,648,680	46,436	—	35,237,769	1,094,960,867
1961	15,904,989	683,676,928	15,884,170	624,818,038	23,783,871	39,688,860	1,139,322,463	2,218,478	14,211	—	37,456,171	1,132,417,038
1962	15,510,301	699,187,229	16,635,095	641,453,133	24,532,794	40,043,095	1,179,365,558	3,191,312	16,376	—	36,835,407	1,169,252,445
1963	15,639,251	714,826,480	17,469,645	658,922,778	26,484,904	42,124,155	1,221,489,713	4,512,371	2,835	—	37,608,949	1,206,861,394
1964	16,088,958	730,915,438	17,431,359	676,354,137	28,139,106	44,228,064	1,265,717,777	13,979,667	—	—	30,248,397	1,237,109,791
1965	19,307,299	750,222,737	17,050,749	693,404,886	32,151,623	51,458,922	1,317,176,699	24,287,868	—	2,292,897²/	24,878,157	1,261,987,948
1966	22,134,754	772,357,491	16,784,305	710,189,191	39,063,535	61,198,289	1,378,374,988	39,955,511	—	3,550,695	17,692,083	1,279,680,031
1967	20,713,294	793,070,785	13,942,396	724,131,587	42,295,433	63,008,727	1,441,383,715	46,315,076	—	2,394,419	14,299,232	1,293,979,263
1968	19,310,649	812,381,434	10,763,684	734,895,271	45,576,532	64,887,181	1,506,270,896	53,606,933	—	2,489,167	8,791,081	1,302,770,344
1969	17,565,468	829,946,902	8,330,682	743,225,953	49,328,694	66,894,162	1,573,165,058	64,594,575	—	477,774	1,821,813	1,304,592,157
1970	16,388,544	846,335,446	7,333,112	750,559,065	52,468,144	68,856,688	1,642,021,746	65,228,185	—	748,281	2,880,222	1,307,472,379
1971	16,488,134	862,823,580	6,579,612	757,138,677	55,745,977	72,234,111	1,714,255,857	148,890,213	—	1,160,674	(77,816,776)	1,229,655,603
1972	21,640,478	884,464,058	5,794,342	762,933,019	88,731,185	110,371,663	1,824,627,520	162,260,185	—	1,248,732	(53,137,254)	1,176,518,349
1973	20,571,010	905,035,068	5,071,326	768,004,345	101,053,406	121,624,416	1,946,251,936	163,976,891	—	394,236	(42,746,711)	1,133,771,638
1974	18,972,051	924,007,119	4,657,132	772,661,477	107,747,845	126,719,896	2,072,971,832	169,903,703	—	785,335	(43,969,142)	1,089,802,496

1/ Adjusted to agree with 1960 corrected cumulative figure.
2/ Cumulative figure, 1964-65.

VERTICAL SURFACE DISPLACEMENTS ALONG A PART OF THE NEWPORT-INGLEWOOD ZONE OF FOLDS AND FAULTS, LOS ANGELES AND ORANGE COUNTIES, CALIFORNIA

By

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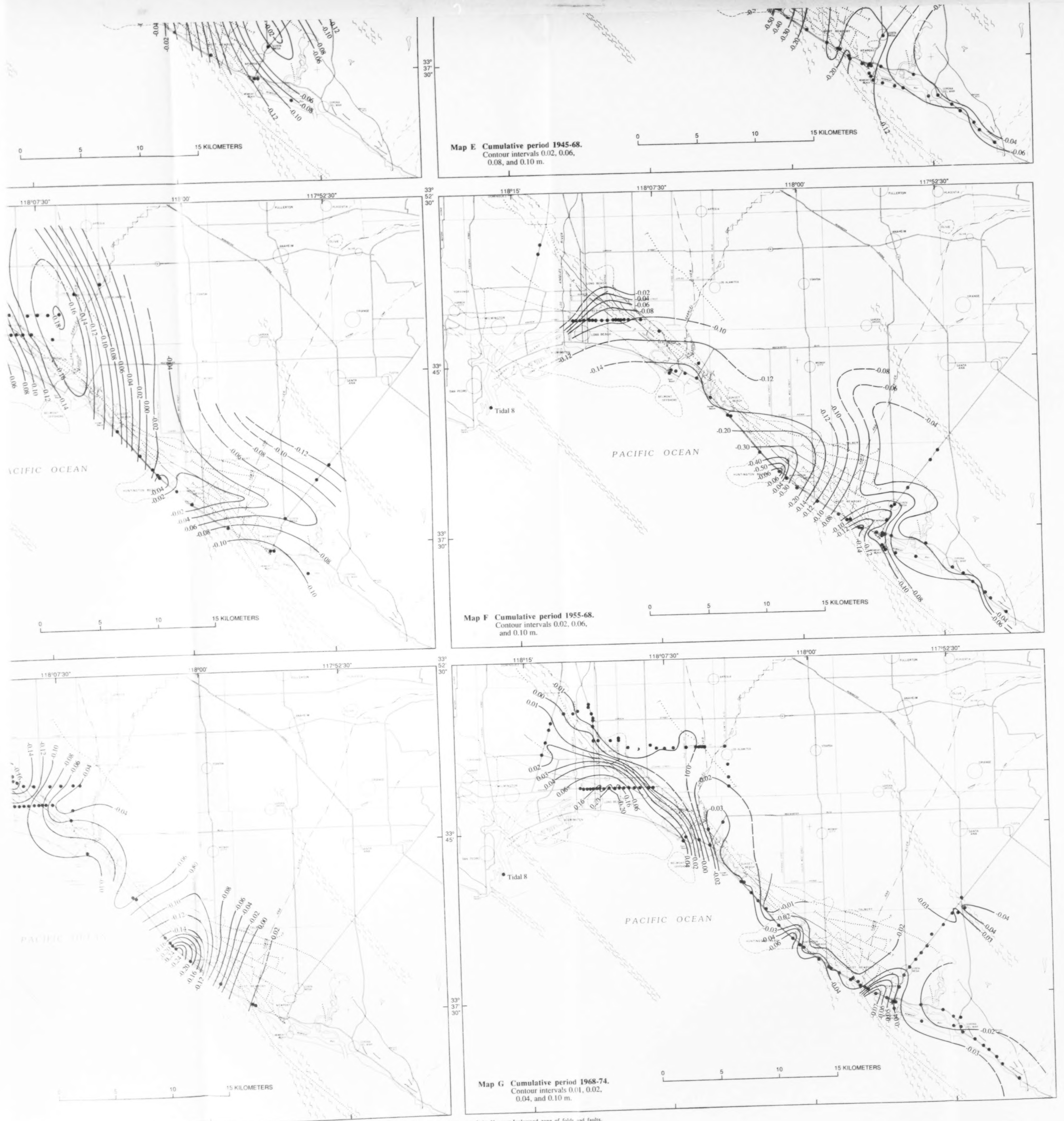
1989



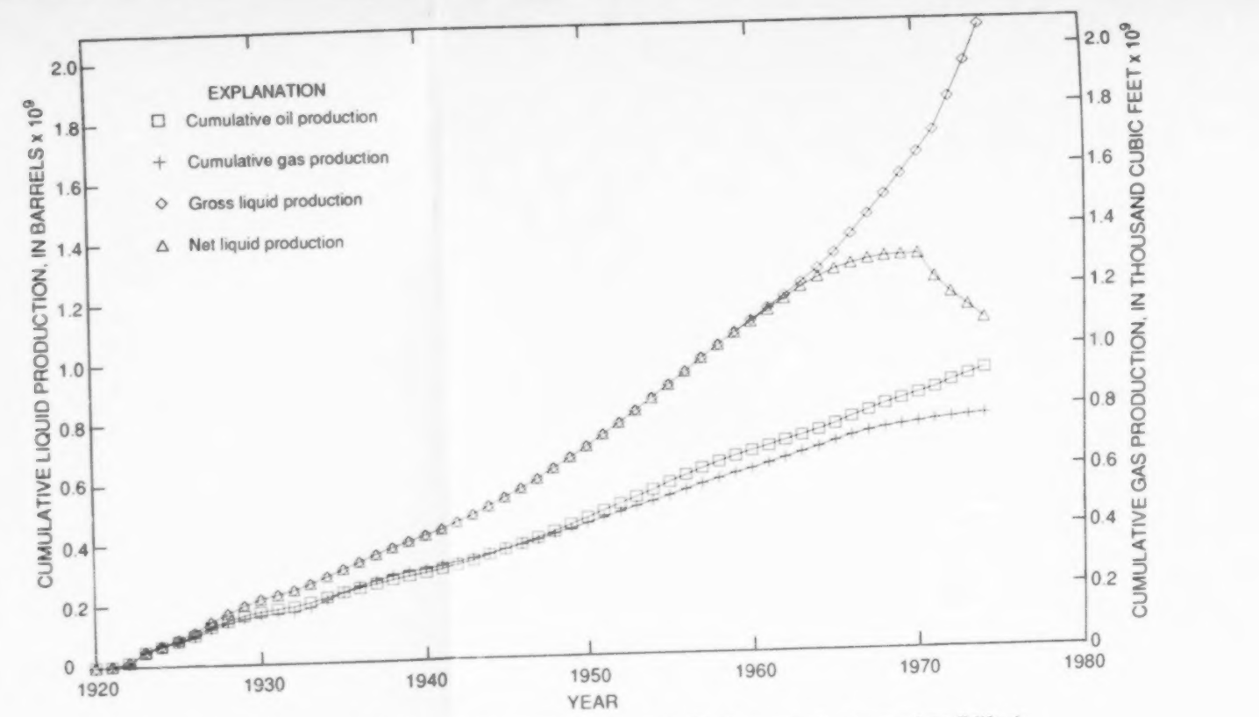


Figure 3. Height changes during selected periods along a part of the Newport-Inglewood zone of folds and faults, with respect to bench mark Tidal 8.

Figure 6. Cumulative production from the Huntington Beach oil field. Based on production figures of the California Division of Oil and Gas in table 3.

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